3 MARCH 1955 ONE SHILLING

ELECTRICAL TIMES

In New Flats . . .

Grosvenor Street Flats, Portsmouth.
City Architect: Mr. Frank Mellor, F.R.I.B.A.
Electrical Contractor: Mr. R. Brock, Gosport.
BICC cables were used exclusively.

. . . or Converted Houses

Bitterne Manor, Southampton.
Architect: Mr. H. Collins, F.R.I.B.A., M.T.P.I.
Electrical Contractors:
Messrs. R. F. Webb, Ltd. Southampton.
BICC cables were used exclusively.

Rubber Insulated Cables to B.S.7

P.V.C. Insulated Cables to B.S.2004

Polythene Insulated and P.V.C. Sheathed Cables to B.S.1557

BICC WIRING CABLES

BRITISH INSULATED CALLENDER'S CABLES LIMITED, 21 BLOOMSBURY STREET, LONDON, W.C.1

BI Callender's

Quicker HEATING...

Quicker SELLING

THE *NEW*

B·N·E

C.90 ELECTRIC COOKER

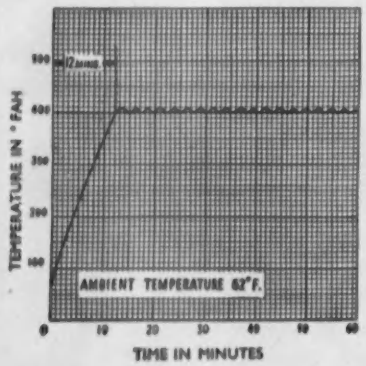
WITH THE AMAZING SPEEDHEAT OVEN!

The outstanding performance of the "Speedheat" Oven in the B.N.E. C.90 Electric Cooker—the newcomer to the B.N.E. range—will make an instant appeal to the discerning housewife.

Here is a big "easy-to-clean" oven with a new element design which, when coupled with the highly reflective pearl grey vitreous enamel and scientifically controlled air circulation, provides remarkably quick heating with superb cooking qualities.

The pre-heating time is only half that of many standard cookers. Every housewife will realise that this spells greater convenience and considerable saving of time and current.

The graph alongside shows that a temperature of 400°F is reached from an ambient temperature of 62° in **only 12 minutes.**

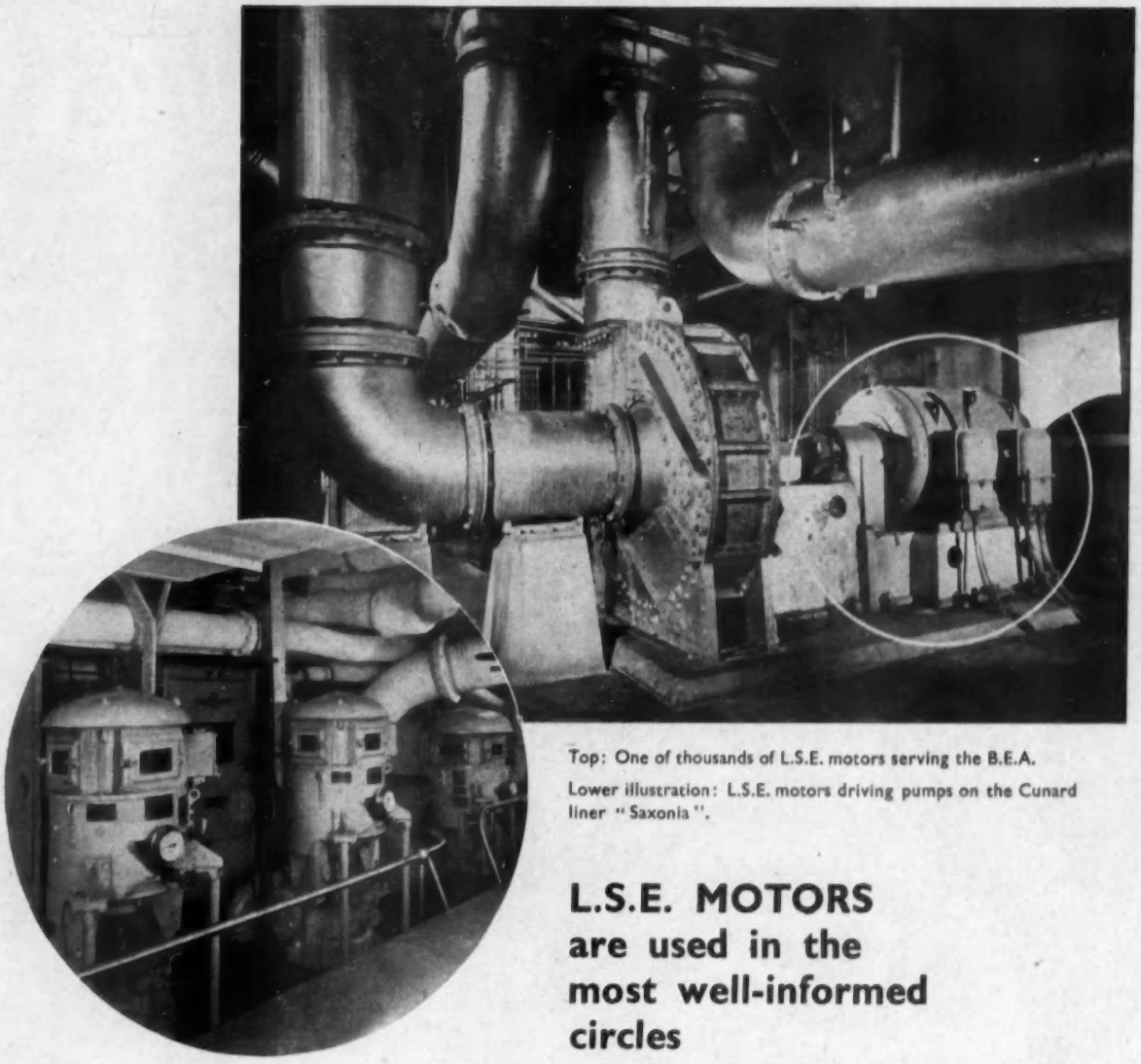


Yes, this new "Luxury" C.90 will be a quick seller—particularly when the purchaser knows that an exclusive Pyrex heat-resisting glass casserole/grill pan, a heated drawer, and an 8' radiant plate with simmer control are all included for the moderate price of £48.

BRITISH NATIONAL ELECTRICS LTD.

The Domestic Appliance Section of JOHNSON & PHILLIPS LTD.

NEWARTHILL MOTHERWELL SCOTLAND



Top: One of thousands of L.S.E. motors serving the B.E.A.

Lower illustration: L.S.E. motors driving pumps on the Cunard liner "Saxonia".

L.S.E. MOTORS are used in the most well-informed circles

More than fifty modern British power stations are equipped with L.S.E. motors, which are available with the special characteristics required for the efficient operation and control of boiler house auxiliaries.

More than fifty per cent of the motor ships and most of the larger steamships completed in Great Britain during 1954 have L.S.E. electric motors, again because types exactly suited to the requirements are made.

For seventy years, engineers have known that L.S.E. motors, and control gear too, are designed with fitness for purpose as the main consideration.

LAURENCE, SCOTT & ELECTROMOTORS LTD.

Electrical Engineers since 1883

NORWICH, MANCHESTER, LONDON AND BRANCHES

GENERATOR TRANSFORMERS
up to the largest sizes

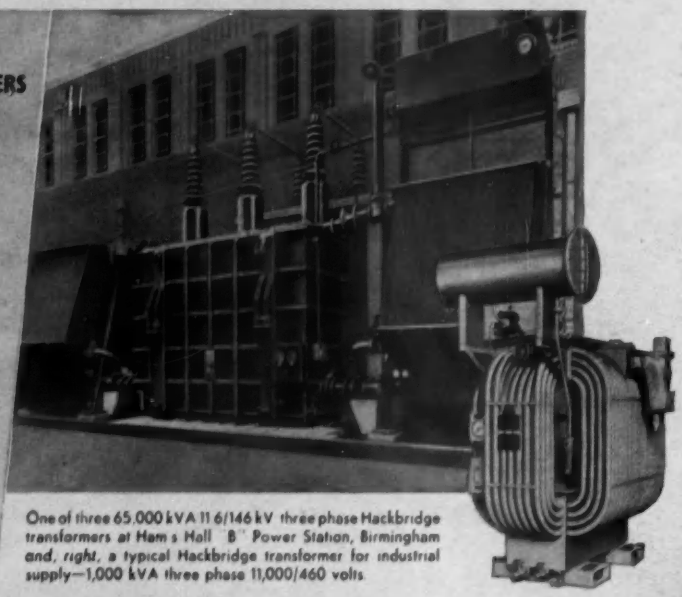
DISTRIBUTION TRANSFORMERS

INDUSTRIAL TRANSFORMERS

INSTRUMENT TRANSFORMERS
of any class of accuracy

REACTORS

ARC SUPPRESSION COILS



One of three 65,000 kVA 11 6/146 kV three phase Hackbridge transformers at Ham s Hall "B" Power Station, Birmingham and, *right*, a typical Hackbridge transformer for industrial supply—1,000 kVA three phase 11,000/460 volts

HACKBRIDGE TRANSFORMERS

* IN SERVICE IN OVER 50 COUNTRIES *

Hewittic Rectifiers

For the operation of :

ELECTRIC RAILWAYS
600, 1,500 and 3,000 volts D.C.

TRAMS AND TROLLEY BUSES

ELECTROLYTIC PLANT

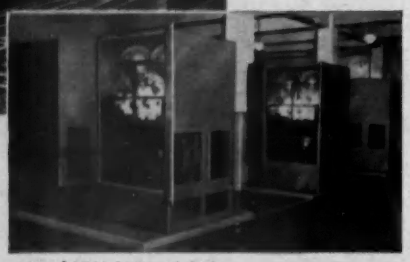
D.C. LIGHT AND POWER NETWORKS

D.C. DRIVEN MACHINERY
in steelworks, gasworks, textile works and factories

D.C. TRUCKS AND LOCOMOTIVES

FOR DOCKSIDE D.C. SUPPLY

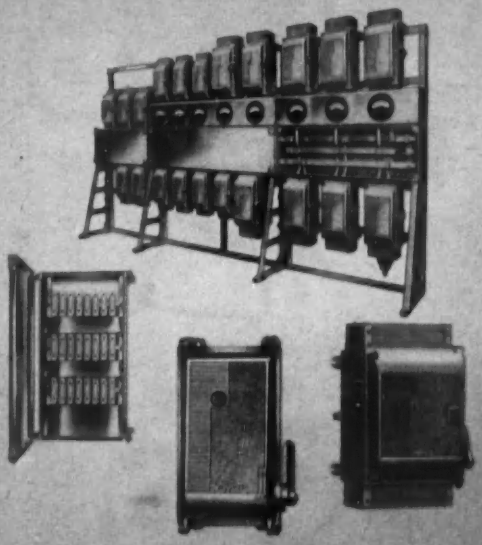
FOR BATTERY CHARGING



A train passing one of fourteen Hewittic rectifier substations (total capacity 24,260kW.) on the Liverpool-Southport line, British Railways and, *right*, Hewittic Rectifiers in traction service in Canada (British Columbia Electric Co.). Each bank has a capacity of 1,500 k.W. with high overload rating for heavy traction service. The total capacity of Hewittic Rectifiers on this system is approximately, 30,000 kW.

HACKBRIDGE AND HEWITTIC ELECTRIC CO., LIMITED
WALTON-ON-THAMES - SURREY - ENGLAND
Telephone : Walton-on-Thames 760 (8 lines) *Telegrams : "Electric, Walton-on-Thames"*

You cannot buy better gear



THE COMPLETE INSTALLATION

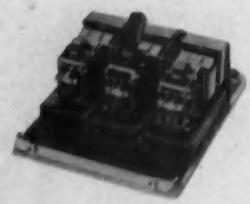
by

STAND Nº 143
A.S.E.E. EXHIBITION
EARLS COURT 15TH - 19TH MARCH 1955

BILL SWITCHGEAR LTD.
ASTON LANE · PERRY BARR
BIRMINGHAM·20

LONDON, SW1 A. W. ZELLEY 64 PETER ST. | MIDLANDS G. H. GARRETT HEAD OFFICE | NORTH MIDLANDS C. G. BACHELOR HEAD OFFICE | CHELTENHAM C. GEARING LECKHAMPTON HILL | MANCHESTER 5 H. H. POLLARD WOOD STREET | BRISTOL 1 W. L. WHITE CHURCH LANE | LEEDS 7 N. SHARPLES 2 LOVELL RD. | GATESHEAD 8 S. J. DAVIS 252 PRINCE CONSORT RD. | GLASGOW J. D. HARRIS 97 [illegible] LANE

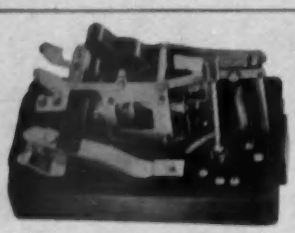
Chilton 'Atlas' Miniature H.R.C. Circuit Breaker



Chilton 'Atlas' Triple Pole Circuit Breaker

CHILTON

STAND 180



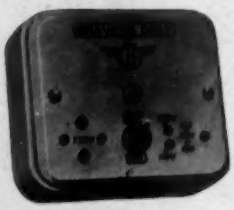
Chilton Earth Leakage Circuit Breaker

Kub Dry Shaver

CHILTON

Chilton Electric Products Ltd., Hungerford, Berks. London Office: 19 Old Queen Street, S.W.1 Trafalgar 3035

Buk Dry Shaver



Chilton Universal Shaver Socket

CONDUIT & FITTINGS SUPPLIED BY

A COMPANY

METALLIC

Oswin House, Bradford. Photo by courtesy of Stroud, Riley & Co., Ltd.

Electrical Contractors: A. R. Farrar & Co., Ltd., Bradford.

It may be a School, it may be a Factory – a Power Station or a Housing Estate, but more often than not the electrical specification will be – METALLIC.

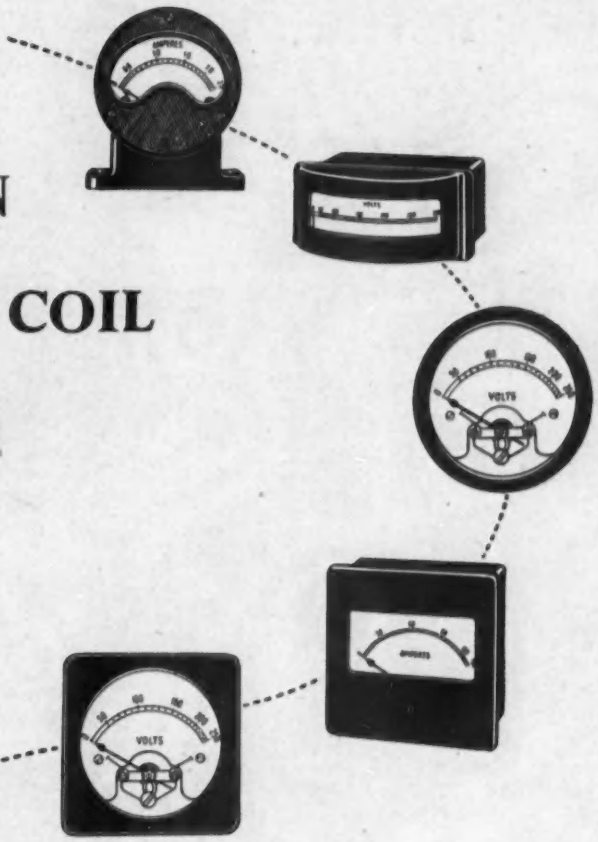
This Yorkshire building is no exception, being fitted throughout with METALLIC Conduit and Fittings – unequalled for quality and consistent accuracy.

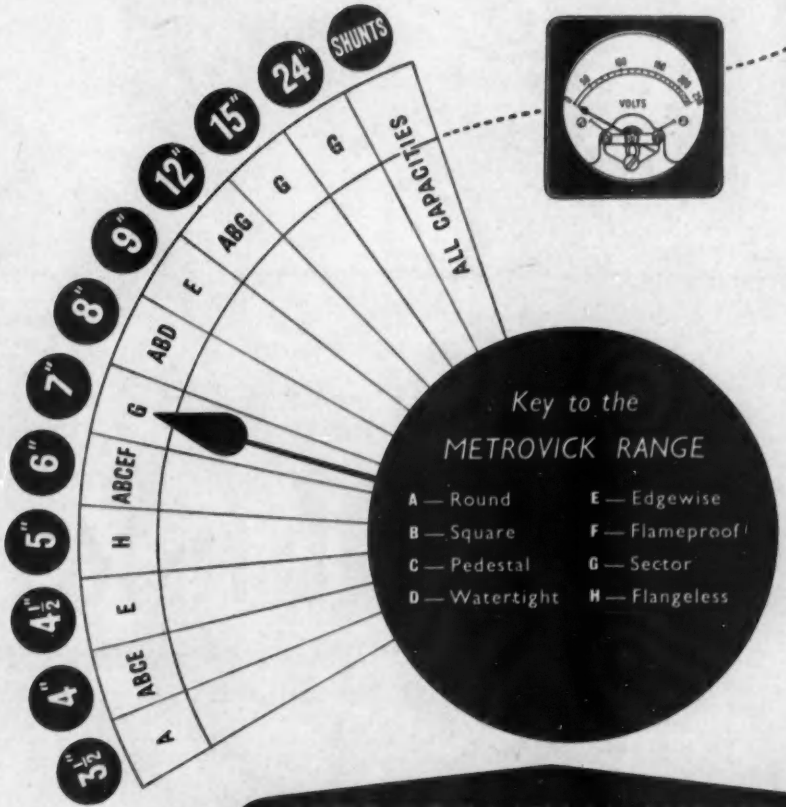
THE METALLIC SEAMLESS TUBE CO. LTD.

LUDGATE HILL • BIRMINGHAM • 3

ALSO AT LONDON • NEWCASTLE-ON-TYNE • LEEDS • SWANSEA & GLASGOW

MOVING IRON AND MOVING COIL INSTRUMENTS





For dependability and accuracy specify METROVICK

Write for Publication 346/1-1 and 347/2-1

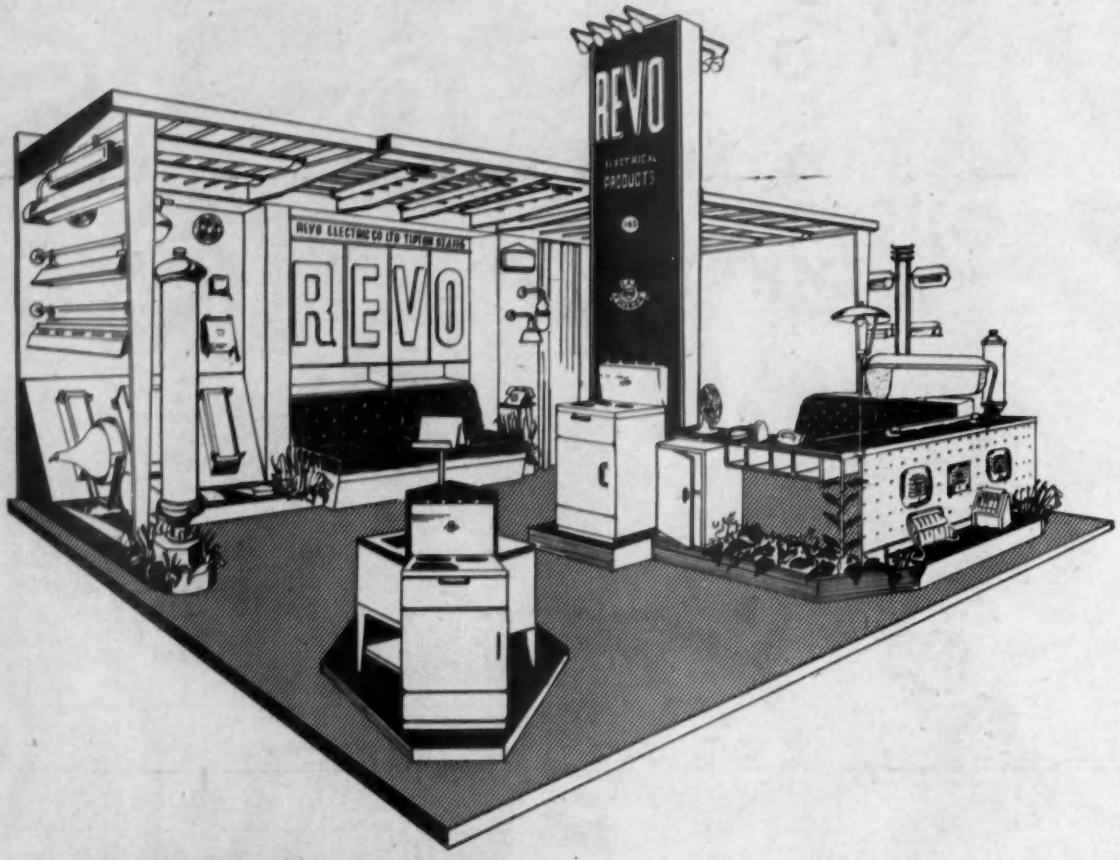
METROPOLITAN-VICKERS
ELECTRICAL CO LTD · TRAFFORD PARK · MANCHESTER, 17

Member of the A.E.I. group of companies

Instruments for all Electrical Measurements

G/A 408

Here is the stand you MUST visit . . .



REVO
REGD.

STAND Nº 163

ELECTRICAL ENGINEERS EXHIBITION
Earls Court, London, March 15th—19th

We shall be pleased to meet old and new friends on Stand 163 to renew past associations and introduce our extensive range of Electrical Products to interested visitors.

REVO ELECTRIC CO. LIMITED, TIPTON, STAFFS

TELEPHONE: TIPTON 1891
TELEGRAMS: "REVO, TIPTON"

Branches at LONDON, MANCHESTER, CARDIFF, GLASGOW, LEEDS, NEWCASTLE-ON-TYNE, BELFAST, DUBLIN

Manufacturers of: Electric Cookers, Domestic Appliances, Public & Industrial Lighting Equipment, Switch & Fusegear, Electric Fans

WHICHEVER TYPE YOU REQUIRE

CHOOSE PIRELLI-GENERAL

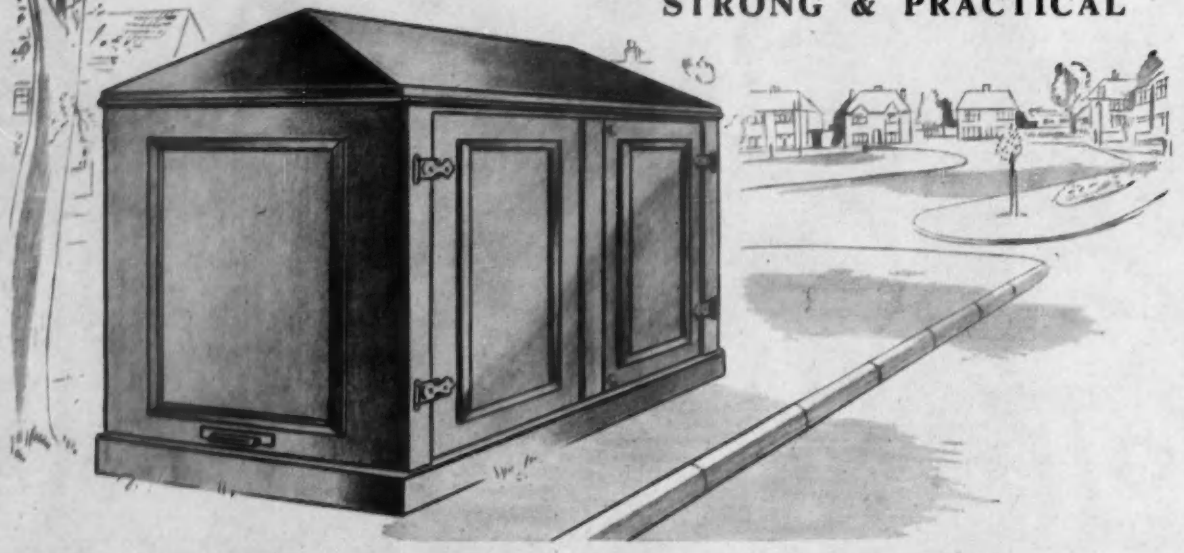
cables

AND ORDER FROM THE *G.E.C.*

THE GENERAL ELECTRIC CO. LTD · MAGNET HOUSE · KINGSWAY · LONDON · W.C.2

STEEL OR CAST IRON **KIOSKS** *IN ALL SIZES*

STRONG & PRACTICAL



HARDY & PADMORE LTD., WORCESTER FOUNDRY, WORCESTER

Phone : Worcester 3215 Grams : "QUALITY," WORCESTER

M-W.110

Of tubular construction with no connection to the outside atmosphere, these PREMIER Coolers of advanced design have already been installed in many important power stations both in Britain and abroad.

PREMIER

CLOSED CIRCUIT AIR AND HYDROGEN COOLERS

THE PREMIER COOLER & ENGINEERING CO., LTD., SHALFORD, near GUILDFORD, SURREY

are SMITHS instrumental

G.E.C. measures speed with Smiths Hand Tachometers

The Hand Tachometer shown here is being used to measure the rotational speed, during normal testing, of a G.E.C. 10 kW, 125 volt exciter, which forms part of a motor generator set.

The Smiths Hand Tachometer is a versatile portable hand instrument which enables immediate and accurate readings to be taken of r.p.m. of shafts, or feet/metres per minute of belts, irrespective of the direction of rotation. Readings may be taken in obscured positions by pressing a button to lock the pointer at the reading. Write now for leaflet Y.596 giving details of four models covering 0-50,000 r.p.m. Price: Net £12.12.0. complete with accessories and case.

SMITHS

SMITHS INDUSTRIAL INSTRUMENTS LTD.

Chronos Works, North Circular Road, London, N.W.2.
Northern Sales Office: York House, 12 York Street, Manchester.
The Industrial Instrument Division of S. Smith & Sons (England) Ltd.

188-276

C·M·A ranges far and wide!

PRODUCTION of many types and sizes of electric cables is the keynote of the service offered by members of the Cable Makers Association.

It is not by the manufacture of only a few types of cable in popular demand that the C.M.A. members have been able to contribute so handsomely to home and overseas markets. Rather it is by producing a complete range including cables for specialised duties . . . and, most important of all, cables that fulfil the exacting demands of to-day.

Technical advice concerning cables is freely available from members.

MEMBERS OF THE C.M.A.

British Insulated Callender's Cables Ltd. · Connollys (Blackley) Ltd · The Craigpark Electric Cable Co. Ltd · Crompton Parkinson Ltd · The Edison Swan Electric Co. Ltd · Enfield Cables Ltd · W. T. Glover & Co. Ltd · Greengate & Irwell Rubber Co. Ltd · W. T. Henley's Telegraph Works Co. Ltd · Johnson & Phillips Ltd · The Liverpool Electric Cable Co. Ltd. Metropolitan Electric Cable & Construction Co. Ltd · Pirelli-General Cable Works Ltd. (The General Electric Co. Ltd.) · St. Helens Cable & Rubber Co. Ltd · Siemens Brothers & Co. Ltd. (Siemens Electric Lamps & Supplies Ltd.) Standard Telephones & Cables Ltd · The Telegraph Construction & Maintenance Co. Ltd.

The Roman Warrior and the letters "C.M.A." are British Registered Certification Trade Marks.

You are invited to visit us on STAND No. 10 Electrical Engineers Exhibition 15th-19th March

Insist on a cable with the C·M·A label

CABLE MAKERS ASSOCIATION, 52-54 HIGH HOLBORN, LONDON, W.C.1 Telephone: Holborn 7633

CMA/3

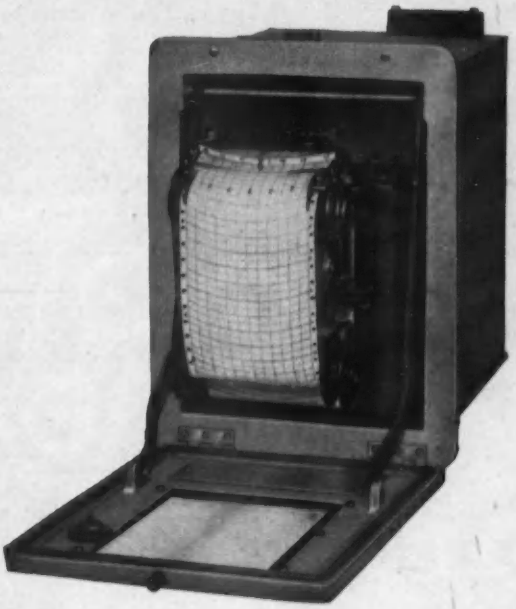
"Inkwell"

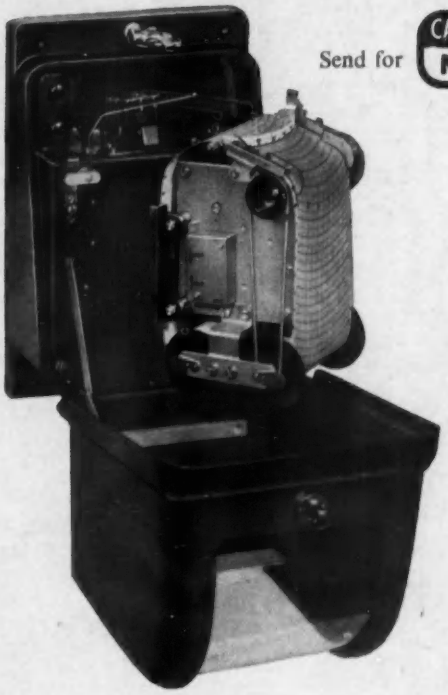
GRAPHIC INSTRUMENTS

Unique Visibility and Chart Width

PANEL SPACE:
PROJECTING $8\frac{3}{8}$" x $11\frac{7}{8}$"
FLUSH $10\frac{3}{4}$" x $14\frac{3}{8}$"

Visible chart $4\frac{1}{2}$" wide, 8" long. No recorder of comparable size gives such unique visibility and chart width.





Send for CATALOGUE SHEET No 300 E

Movements: High Torque, High efficiency type, screened and magnetically damped.

Pen: Syphon type, minimum friction, unaffected by level of ink.

Ink: Central inkwell, large capacity, easily accessible.

Chart: Roll type, speeds up to 12" per minute.

Chart Drives: Swing pattern for easy access, electrical or spring drive.

Flush Pattern: All working parts move forward automatically when case is opened.

Indicating Scale: Always visible, with 8" of completed record.

For best results always use "Inkwell" charts.

EVERETT EDGCUMBE

Designers and manufacturers of almost every type of electrical indicating and recording instrument. Specialists in: Speed Recording, Photometry, Process Time Control, Telemetering.

COLINDALE WORKS LONDON N.W.9 **TELEPHONE: COLINDALE 6045**

DHB/EE/2043

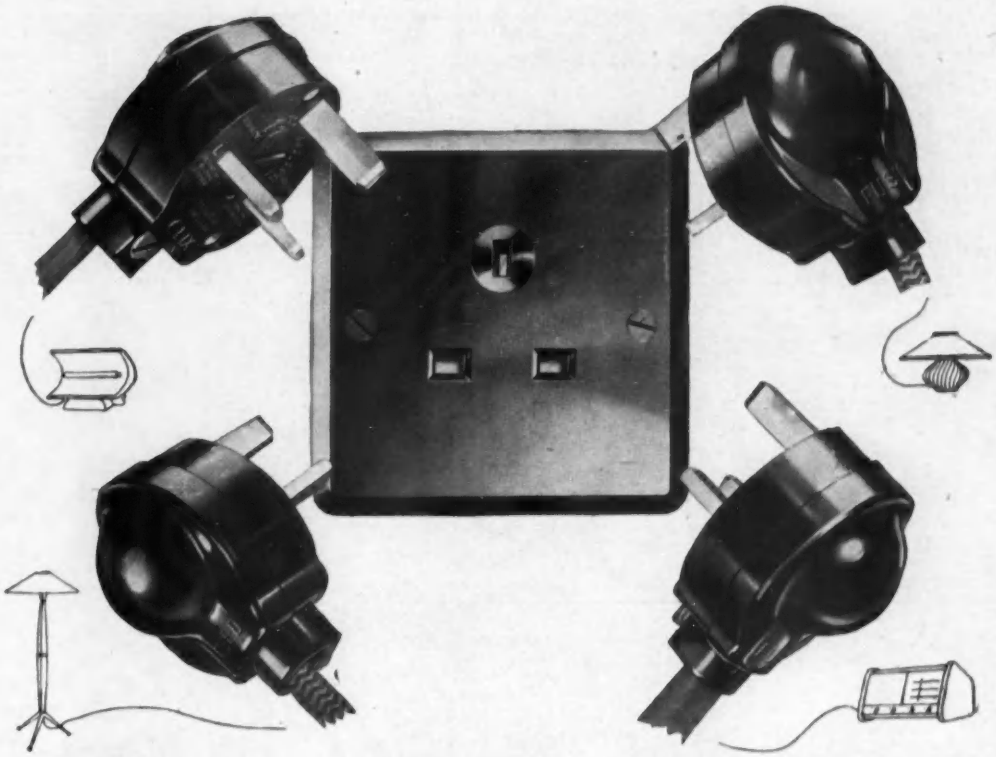
LIGHTING

In public halls and civic assembly rooms the need for emergency lighting is now accepted. In future buildings of this sort the stand by electrical system will be planned at the same time as the main lighting is planned. Chloride Batteries Ltd. makers of Keepalite, the automatic emergency lighting system, offer the advisory services of their engineers to architects and electrical contractors in any part of Britain.

Keepalite

FOR PUBLIC HALLS

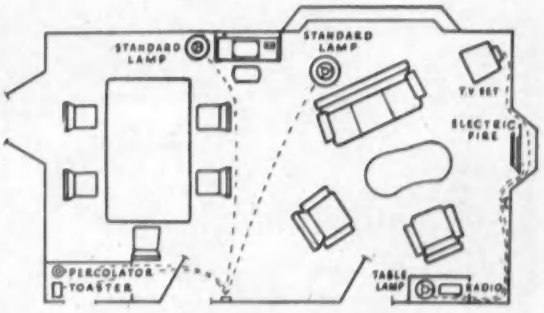
A Product of Chloride Batteries Limited, Exide Works, Clifton Junction, Swinton, Manchester and Grosvenor Gardens House, Grosvenor Gardens, SW1 S.73A



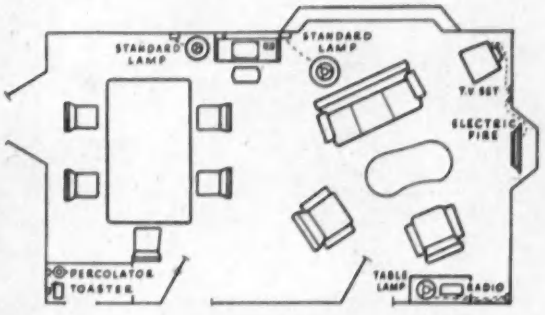
4 into 1 *won't* go...

...so be generous when specifying the number of Socket Outlets for each room.

THE Windsor range of Ediswan Wiring Accessories includes all types of 13 amp. Socket Outlets, Switch Socket Outlets and rectangular pin fused Plugs required for normal installations—quality Accessories at competitive prices. Remember also that Ediswan manufacture a Plug which can be re-fused in 15 seconds.



Insufficient socket outlets wrongly placed. Note the long trailing flexibles running dangerously across doorways and "traffic ways".



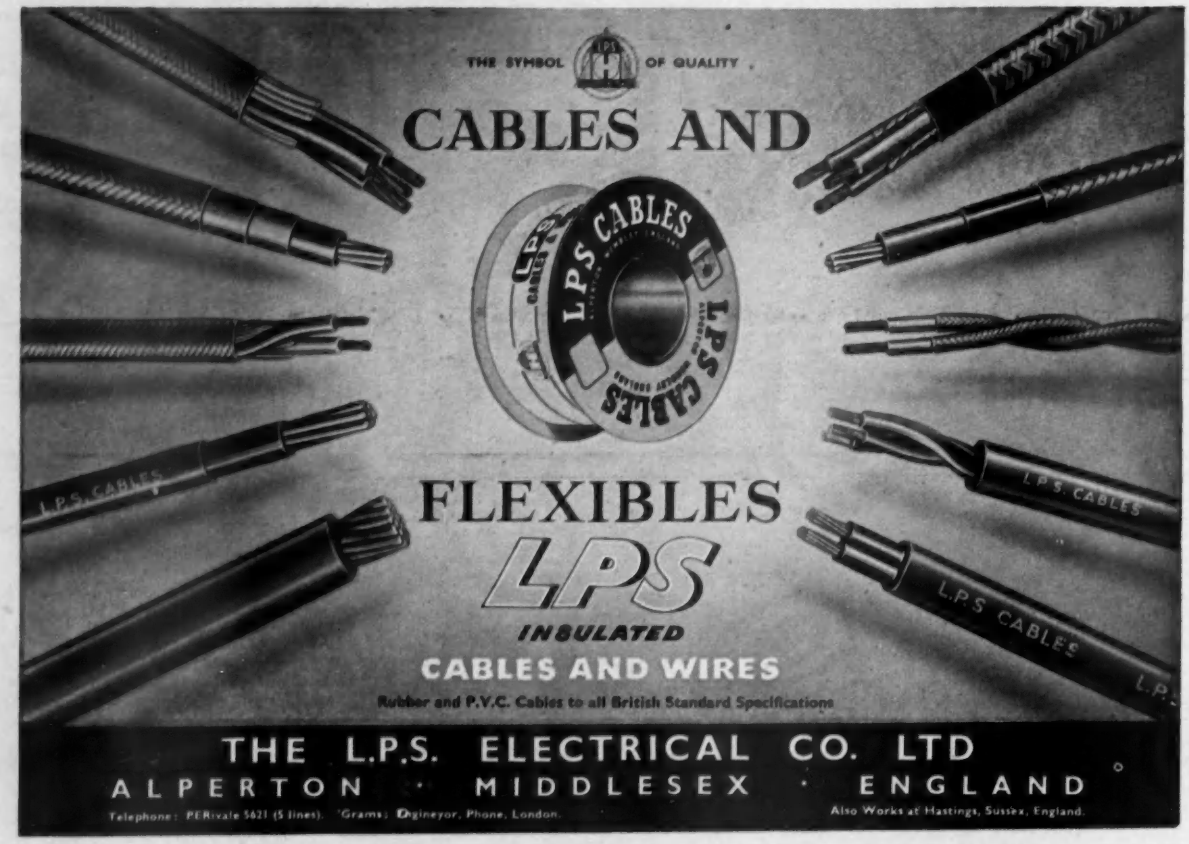
Correct arrangement of socket outlets. Long flexibles and inconvenient adaptors are avoided.

EDISWAN

ELECTRIC WIRING ACCESSORIES

THE EDISON SWAN ELECTRIC CO. LIMITED
155 Charing Cross Rd., London, W.C.2 and Branches
Telephone: GERrard 8660
Member of the A.E.I. Group of Companies.

E.37


THE SYMBOL OF QUALITY
CABLES AND
L.P.S. CABLES
FLEXIBLES
LPS
INSULATED
CABLES AND WIRES
Rubber and P.V.C. Cables to all British Standard Specifications
THE L.P.S. ELECTRICAL CO. LTD
ALPERTON · MIDDLESEX · ENGLAND
Telephone: PERivale 5621 (5 lines). Grams: Engineyor, Phone, London.
Also Works at Hastings, Sussex, England.

WE ARE EXHIBITING AT THE
FOURTH ELECTRICAL ENGINEERS EXHIBITION
EARLS COURT MARCH 15-19

Here's silent drilling at phenomenal speeds!

TILE, STONE, CAVITY BRICK—it's all one with Durium-tipped Drills—sharp, accurate holes, *without noise*, at speeds you'll hardly believe till you try these astonishing tools! These fastest-of-all masonry cutters are tipped with Durium, a new carbide combining complete tungsten-carbide hardness with exceptional toughness. *Look for the name 'Durium' on the shank*—no other is a genuine Durium Drill. Use Durium-tipped Drills in either hand or power drills—there's a complete range of sizes and lengths for every need, including drilling through walls. These remarkable tools save time and money—write for details today.

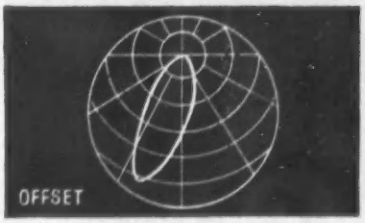
RAWLPLUG
DURIUM
Registered Trade Mark
TIPPED DRILLS
FOR MASONRY AND ALL TILES
THE RAWLPLUG COMPANY LIMITED
CROMWELL ROAD · LONDON · S.W.7

Write for 16-page full-colour "Hole Boring" brochure Pub. No. T1412.

8449

ARCHITECTURAL SCHEMES

A New Lighting Approach



INTENSIVE • CONCENTRATING • OFFSET

A new lighting approach to Architectural schemes has been made possible by the development of a range of Holophane 'LENTILITE' (REGD.) Circular In-Bilt units which give Intensive, Concentrating and Offset light distributions.

The range includes Flush and Semi-recessed units for recessment into the ceiling, and Close-Ceiling units for use where recessment is not possible.

'Lentilite' units give the Architect wide scope for integral design while affording a high standard of light control combined with pleasing appearance. Full details and technical information available on request.

HOLOPHANE LIMITED

SCIENTIFIC ILLUMINATING ENGINEERS

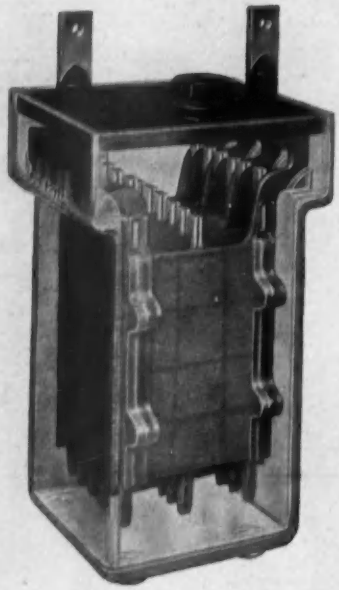
STAND No. 74
A.S.E.E. EXHIBITION
EARLS COURT
MARCH 15-19, 1955

ELVERTON STREET, WESTMINSTER, LONDON, S.W.1. Phone: VICtoria 8062. Grams: Holophane Sowest London

DP Stationary batteries

65 years have passed since the first D.P. battery was made

Every D.P. battery produced to-day embodies the wide experience gained during this long period devoted exclusively to the manufacture of batteries for all purposes.



The two examples illustrated are a sealed type 75 ampere-hour cell as used for emergency lighting and power stations, and a large 10,200 ampere-hour cell in a wood lead-lined box.

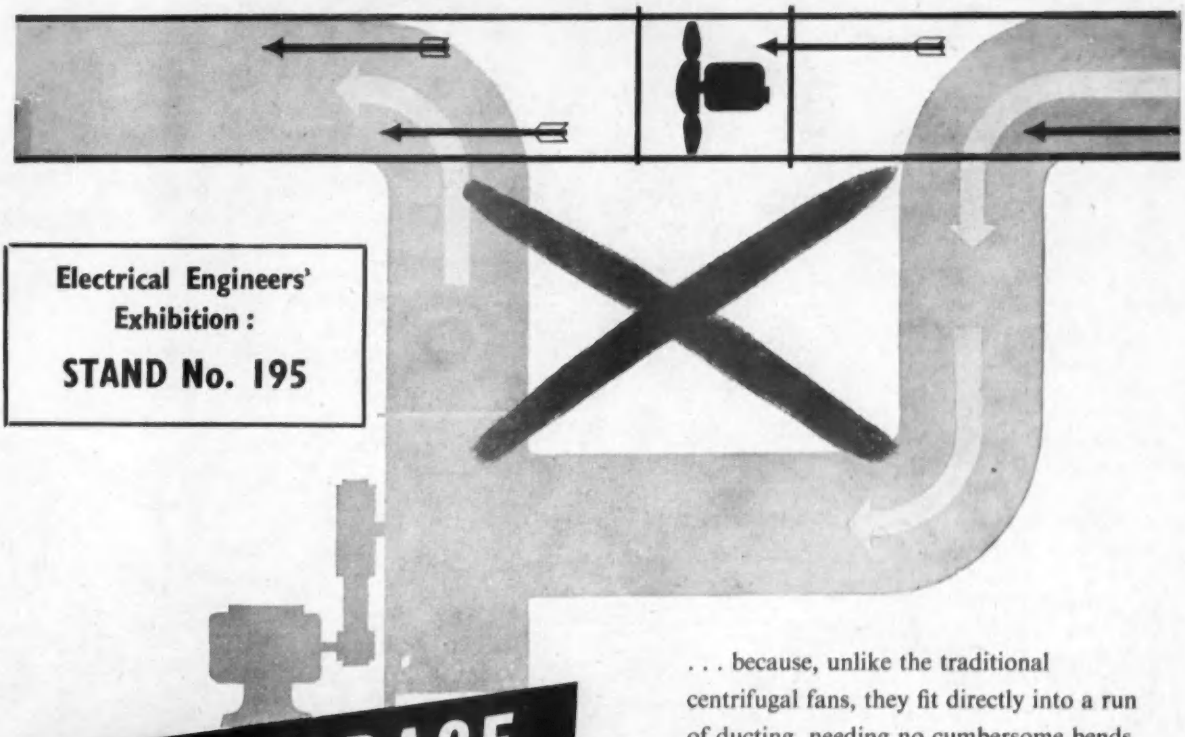
Sizes of Planté batteries manufactured and installed by this company, range in capacity from 10 to 13,000 ampere-hours.

THE D.P. BATTERY CO., LTD., BAKEWELL, DERBYSHIRE

'Phone: Bakewell 81 LONDON: 66, VICTORIA ST., S.W.1 'Phone: Victoria 9661/2

1273

AEROFOIL FANS



Electrical Engineers' Exhibition:

STAND No. 195

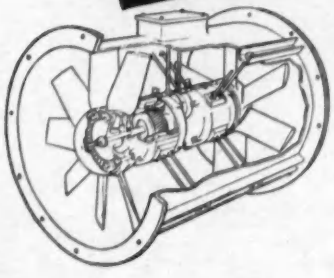
SAVE SPACE

. . . because, unlike the traditional centrifugal fans, they fit directly into a run of ducting, needing no cumbersome bends, *taking up no floor space at all.*

SAVE MONEY

. . . because ease of installation saves initial cost, because they are generally more efficient, consuming less watts for any given duty.

Pressures up to 20″ s.w.g. can be obtained by multi-staging standard contra-rotating units. Write for publication V.1089.



WOODS AEROFOIL FANS

WOODS OF COLCHESTER LIMITED, BRAISWICK WORKS, COLCHESTER

An associate company of The General Electric Company Ltd.

Technical Representative at:

Birmingham: *Phone: Midland 4421 (Ext. 23 and 68)*
Cardiff: *Phone: 28055*
Glasgow: *Phone: Central 9250 (Ext 286)*
Leeds: *Phone: 32171*
Leicester: *Phone: Granby 721*
Liverpool: *Phone: Royal 7282*
London: *Phone: Chancery 5474*
Manchester: *Phone: Blackfriars 3434*
Middlesbrough: *Phone: 3621*
Newcastle: *Phone: 25160*
Sheffield: *Phone: 25101*
Southampton: *Phone: 3511*

THE SWISS ARE EXPERTS AT WATCH MAKING

Who can doubt it? Even so, the finest timepiece may occasionally be in need of repair. Similarly, faults can develop in the best conceived system of electrical wiring. And much inconvenience it causes when cabling is housed in barrel conduit of the ordinary type. CHANNEL CONDUIT, on the other hand, makes the overhaul of faulty circuits a routine task—for the patented capping *springs* off without difficulty, allowing quick access to the wiring layout. Rust-resisting and vibration-proof, CHANNEL CONDUIT costs less to buy, install and maintain than any other form of trunking. It is extensively used by Industry and Government Departments. Sizes stocked range from 4" × 4" to 1" × ½", and full details may be had by requesting a copy of pamphlet No. R.A.35.

THE CHOICE OF THE EXPERTS

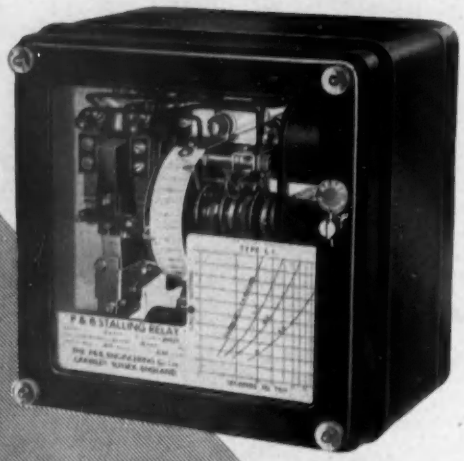
CHANNEL CONDUITS LTD.,
11, Victoria Street, London, S.W.1.
Telephone: ABBey 2027/8

PROTECT YOUR MOTORS against Stalling

Announcing –

The new P & B Stalling Relay, the latest product of the Makers of P & B-Golds Relays giving complete protection against stalling under all conditions. The relay incorporates a dead beat thermal timing element and lock-out feature allowing one only attempted restart.

Send for descriptive Pamphlet.



THE P & B ENGINEERING CO · LTD
CROMPTON WAY · CRAWLEY · SUSSEX
TELEPHONE: CRAWLEY 1004

May we give you a piece of our mind ?

Our technicians are always glad to give you the benefit of their experience. Why not get together before planning that electrical job? The chances are you will save yourself time and trouble.

The BICC Technical Advisory Service has been helping solve customers' problems for many years. Advice is given on the selection, application and installation of electric cables and wires for every purpose—and on the wide range of associated equipment manufactured by BICC.

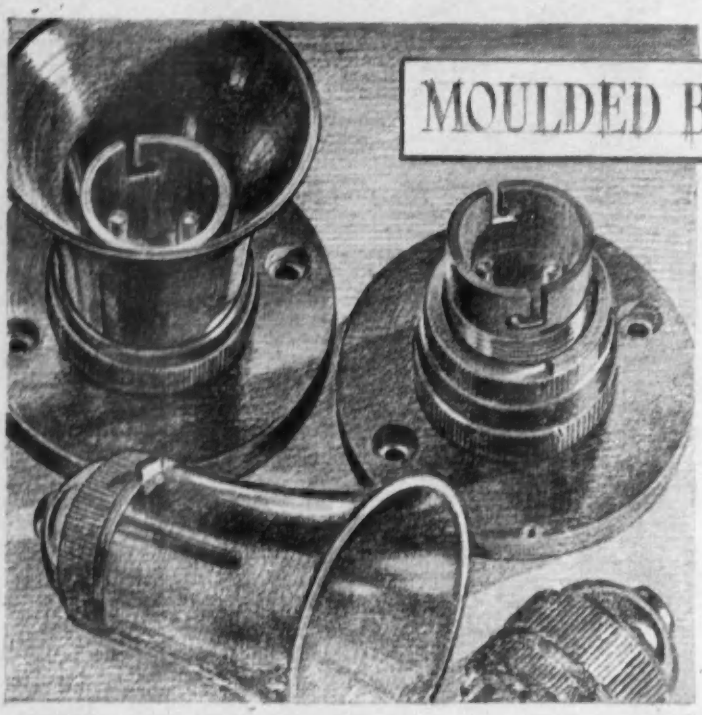
This service of course is entirely without obligation.

BICC

Technical Advisory Service

BI Callender's

BRITISH INSULATED CALLENDER'S CABLES LIMITED
21 BLOOMSBURY STREET, LONDON, W.C.1



MOULDED BAYONET HOLDERS

by Sperryn TRADE MARK

A complete range of Batten, C.T.S., Skirted, Conduit, Switch and Flexible lampholders are available complying with B.S.52

for Efficient Electrical Accessories of Quality

"Specify Sperryn"

SPERRYN & CO. LTD., MOORSOM STREET, BIRMINGHAM 6

LONDON OFFICE:
23 GREAT SUFFOLK STREET, S.E.1

1006

Versatile

INTERLOCKING CABLE MARKERS by Critchley

Using Critchley cable markers, you can build up an unlimited range of markings with a minimum of stock. The interlocking type is supplied in standard markings 0 to 9 and A to Z in either right or left hand entry. Special markings can be supplied to order. *Standard colours are: Black, White, Red, Blue, Green, Yellow.*

KEYED FOR PERMANENT ALIGNMENT

The key on each marker ensures that the ferrules can only be assembled with the figures in line and cannot come out of alignment afterwards.

Leaflet on request

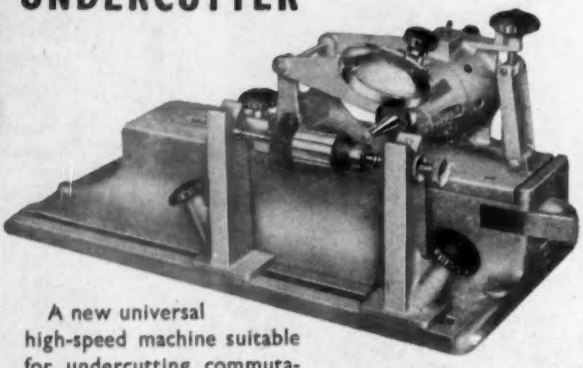
Licensed under Letters Patent 688990

CRITCHLEY BROS. LTD.

Brimscombe, Stroud, Glos. Telephone: Brimscombe 2208

MARTINDALE

BENCH TYPE UNDERCUTTER



A new universal high-speed machine suitable for undercutting commutators of any size up to 6" diameter with armatures up to 10" diameter.

It is the simplest and most efficient machine so far designed for this work.

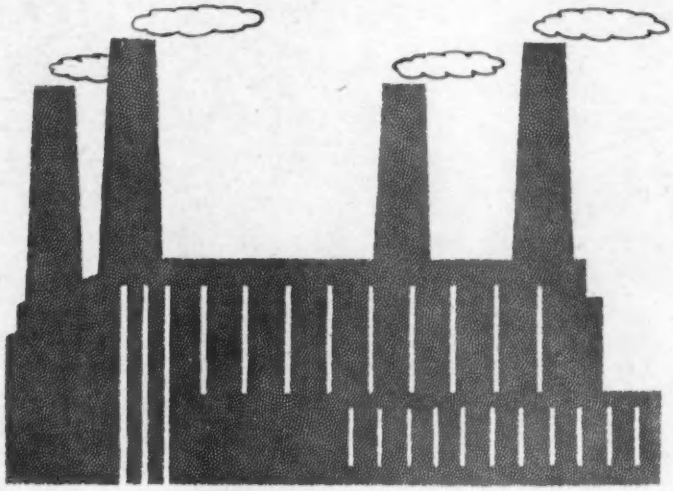
see our exhibits at the
ELECTRICAL ENGINEERS EXHIBITION
Earls Court, London
15 - 19 March
on STAND No. 1

Write for descriptive leaflet to:

MARTINDALE ELECTRIC CO. LTD.

45 WESTMORLAND ROAD, LONDON, N.W.9

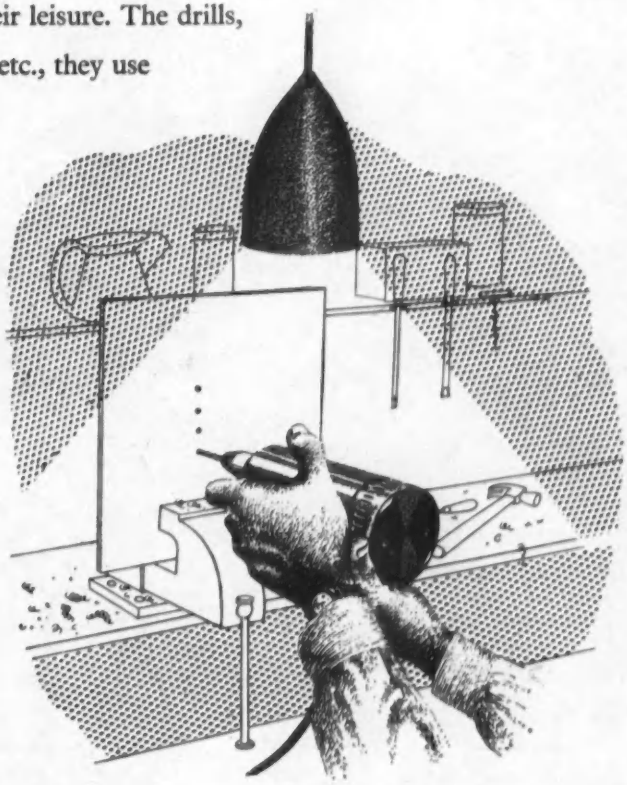
also at 25 ELMBANK STREET, GLASGOW, C.2



what is the connection?

In millions of homes, workshops and garages, men and women employ many and varied power appliances to ease and speed their work and increase their leisure. The drills, lathes, sanders, polishers, cleaners, mixers, etc., they use depend on electricity for their power.

AWCO Conductors provide the vital link between source and consumer. All-Aluminium low tension (240-415 volts) distribution lines supply the needs of these small users most efficiently and economically. Because aluminium conductor is up to 50% less in cost than its copper equivalent, erection is less expensive. Being half the weight of copper, aluminium conductors are easier to transport, handle and erect.



Industry and people depend on electricity—

electricity depends on Aluminium.

AWCO

ALUMINIUM WIRE & CABLE CO. LTD.

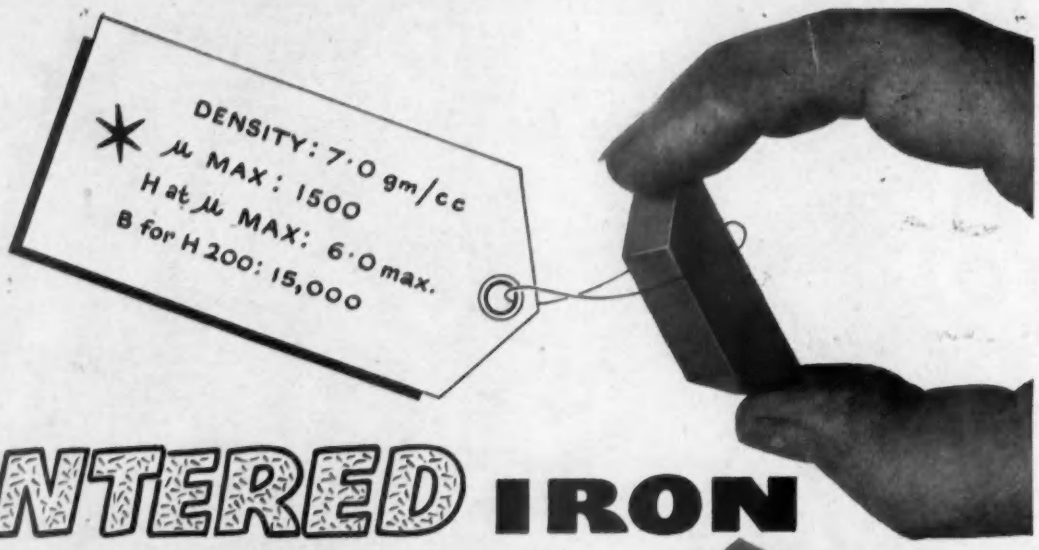
Britain's Largest Manufacturers of Aluminium Wire and Conductors

Head Office & Works: PORT TENNANT, SWANSEA, GLAMORGAN

Sales Office: 30 CHARLES II STREET, ST. JAMES'S SQUARE, LONDON, S.W.1

Telephone: TRAfalgar 6441

210/169



SINTERED IRON

Pole Pieces, Armatures, and Solenoid Components made in one operation by

MPC

★

have HIGHER PERMEABILITY than any other sintered Iron Parts

Complex shapes in M.P.C. Standard SINTERED BRASS, and SINTERED SILVER CONTACTS, are produced with similar high speed, and at low cost. M.P.C. specialize in the manufacture, by powder metal techniques, of parts in sintered Nickel-steel, Iron, Brass, Bronze, Silver and Stainless Steel.

For full details without delay, write to:

METAL & PLASTIC COMPACTS LTD.

MONTGOMERY ST., BIRMINGHAM 11

Telephone: VICtoria 1054

INSULATED WIRES AND STRIPS

BARE COPPER CONDUCTORS

ELECTRIC CABLES AND FLEXIBLES

RESISTANCE WIRES & TAPES

Branch service

OUR ORGANIZATION HAS BRANCH OFFICES AND STORES AT THE UNDERMENTIONED ADDRESSES WHERE WE MAINTAIN

Comprehensive stocks

BIRMINGHAM
119/120 Moseley Street, 12. Tel.: Victoria 3731

BRIGHTON
41 Market Street Tel.: Brighton 24850

BRISTOL
10 Narrow Quay Tel.: Bristol 23753

CARDIFF
East Canal Wharf Tel.: Cardiff 21551

EDINBURGH
7a Young Street Tel.: Caledonian 2283

EXETER
Trinity Mews, Southernhay Tel.: Exeter 55999

GLASGOW
75 Robertson Street, C.2 Tel.: Central 9002

LANCASTER
35 China Street Tel.: Lancaster 5666

LEEDS
44/45 York Place Tel.: Leeds 21991

LEICESTER
Lewcos House, Queen Street Tel.: Leicester 20022

LIVERPOOL
Imperial Chambers, 62 Dale Street Tel.: Central 6808

LONDON
31/33 Spenser Street, S.W.1 Tel.: Victoria 0504

MANCHESTER
4 Chatham Street 1 Tel.: Central 2966

MIDDLESBROUGH
148 Newport Road Tel.: Middlesbrough 2524

NEWCASTLE
61 Blandford Street Tel.: Newcastle 27737

NOTTINGHAM
26 St. Mary's Gate Tel.: Nottingham 43328

READING
Lewcos House, Cardiff Road Tel.: Reading 2900

SOUTHAMPTON
58 Ascupart Street Tel.: Southampton 23539

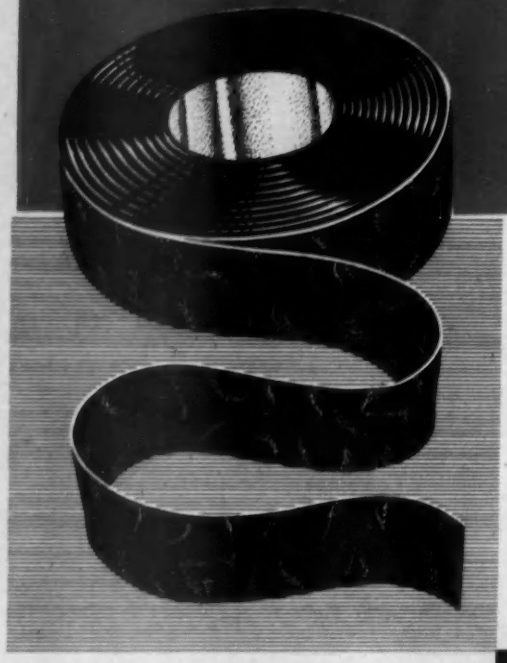
THE LONDON ELECTRIC WIRE COMPANY AND SMITHS, LIMITED
Church Road, Leyton, London, E.10

FREDERICK SMITH & COMPANY
Anaconda Works, Salford 3, Lancs.

THE LIVERPOOL ELECTRIC CABLE Co LTD
Linacre Lane, Bootle, Liverpool 20

VACTITE WIRE COMPANY LTD.
75, St. Simon Street, Salford 3, Lancs.

Glass MICA TAPES



This Electrical Insulating Material combines High Dielectric and High Tensile Strength with Flexibility.

Available in 25 yd, 36 yd and 50 yd rolls in widths from ⅛" upwards, with Bitumen, Synthetic or Natural Gum Bonds.

We can offer Prompt Delivery at Competitive Prices, and shall be pleased to receive your enquiries for all types of Mica Tapes.

Telephone: COPpermill 2248/9
Telegrams: Elmicmer, Easphone, London

EAST LONDON MICA WORKS
RINGWOOD RD., WALTHAMSTOW, LONDON, E.17
ESTD. 1912

FOR FARM & FACTORY WIRING

THE NEW

GILFLEX

FARM & INDUSTRIAL PLASTIC CONDUIT *WIRING SYSTEM*

★ ALL-INSULATED ★
★ NON-INFLAMMABLE ★
★ CORROSION RESISTANT ★
★ WATERTIGHT ★

GILFLEX CONDUITS LTD
41 THE PARADE, HIGH STREET
WATFORD · HERTS
WATFORD 3422

Foundations of Electrical Engineering

By H. COTTON, M.B.E., D.SC., M.I.E.E., and E. W. GOLDING, M.SC.TECH., M.I.E.E., MEM.A.I.E.E. This book is part of a two-volume work for students taking the National Certificate in Electrical Engineering. It covers elementary principles and the design of d.c. machines. 20/- net.

Lighting for Color and Form

By ROLLO GILLESPIE WILLIAMS. A world-famous authority brings together a vast number of different but related branches of knowledge concerning lighting for the architect, scientist, designer, lighting technician, artist, engineer, display expert, photographer, and contractor. 45/- net.

Textbook of Illuminating Engineering

By J. W. T. WALSH, O.B.E. M.A.(OXON.), D.SC.(LON.). A thoroughly revised and completely up-to-date Second Edition of an indispensable textbook to the student of Illuminating Engineering. Of special value to those preparing for the examination of Illuminating Engineering (Intermediate Grade) of the City and Guilds of London Institute. 28/- net.

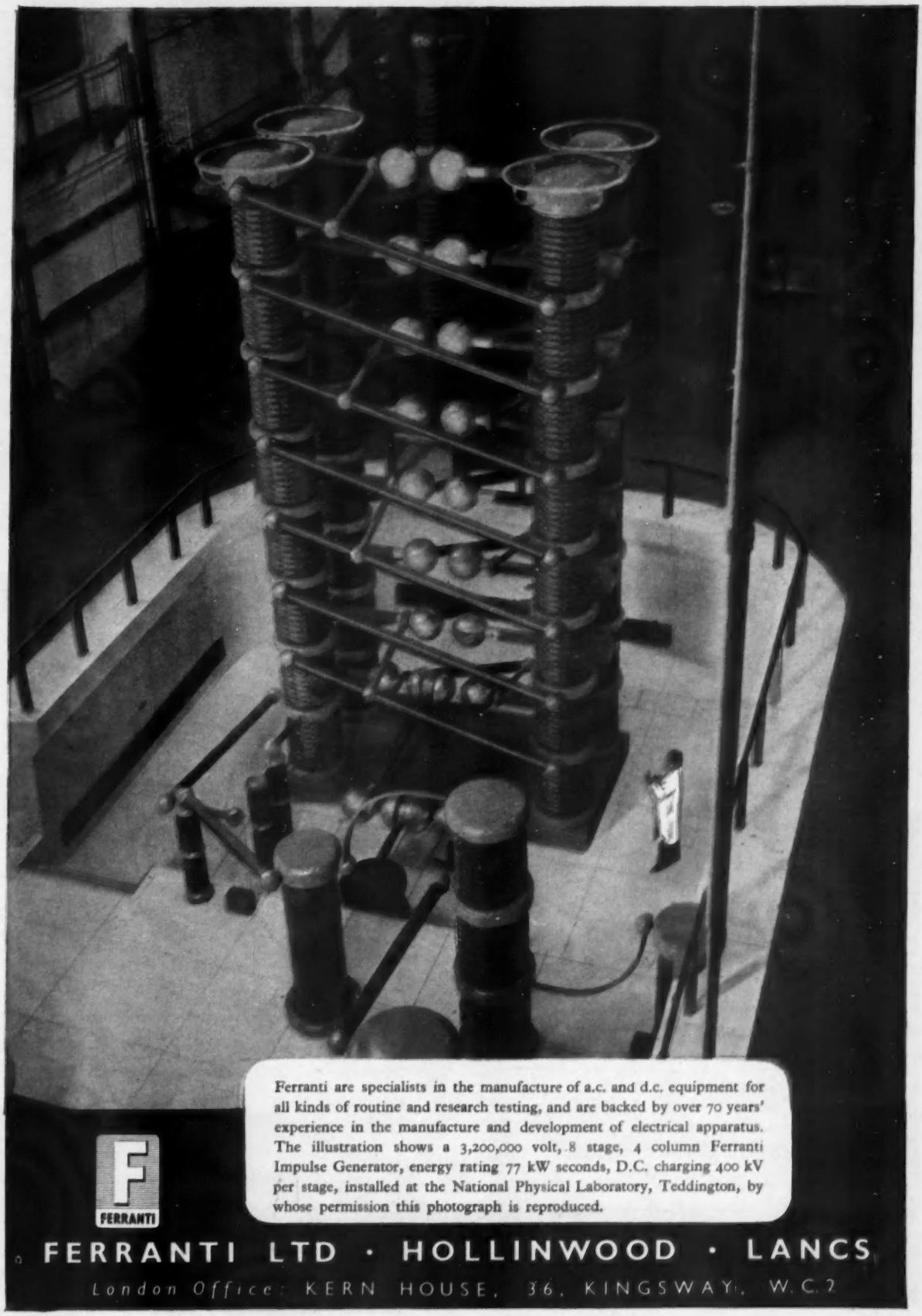
Electrical Technology

By H. COTTON, M.B.E., D.SC., M.I.E.E. Pitman's Engineering Degree Series. Sixth Edition. Illustrated. 25/- net.

". . . Students graduating in civil, mining, or mechanical engineering will find the book just what they need."—ELECTRICIAN.

PITMAN

Parker Street, Kingsway, London, W.C.2



Ferranti are specialists in the manufacture of a.c. and d.c. equipment for all kinds of routine and research testing, and are backed by over 70 years' experience in the manufacture and development of electrical apparatus. The illustration shows a 3,200,000 volt, 8 stage, 4 column Ferranti Impulse Generator, energy rating 77 kW seconds, D.C. charging 400 kV per stage, installed at the National Physical Laboratory, Teddington, by whose permission this photograph is reproduced.

FERRANTI

FERRANTI LTD · HOLLINWOOD · LANCS

London Office: KERN HOUSE, 36, KINGSWAY, W.C.2

FT 157/2

NEW ELECO "PERSPEX" FITTING FOR INDUSTRIAL CONDUIT LIGHTING

—Increases Light Output Ratio 10-15%

This new Eleco fitting (patent applied for) is efficient, versatile and economical. It can be used either open, or made completely dustproof with a diffusor cover. The reflectors are made in two grades of opal 'Perspex', whilst the covers are obtainable in three grades, including a pinspot pattern "Perspex". This means that a suitable combination can be arranged to control the percentage of upward light and brightness over a considerable area. Thus, units can be selected to give the best lighting effect for your particular installation.

TOTAL THESE FEATURES – AND YOU GET TODAY'S MOST EFFICIENT LIGHTING

For 100 to 500 watt tungsten Lamps, 80-125 watt MB/V Mercury.

Lighting output Ratio exceeds 85%. Balanced distribution — 10-25% upward light.

High mechanical strength — Resists corrosion.

Low initial cost.

Ease of installation.

White stove enamelled interior.

For further particulars or help on any lighting problem write to:

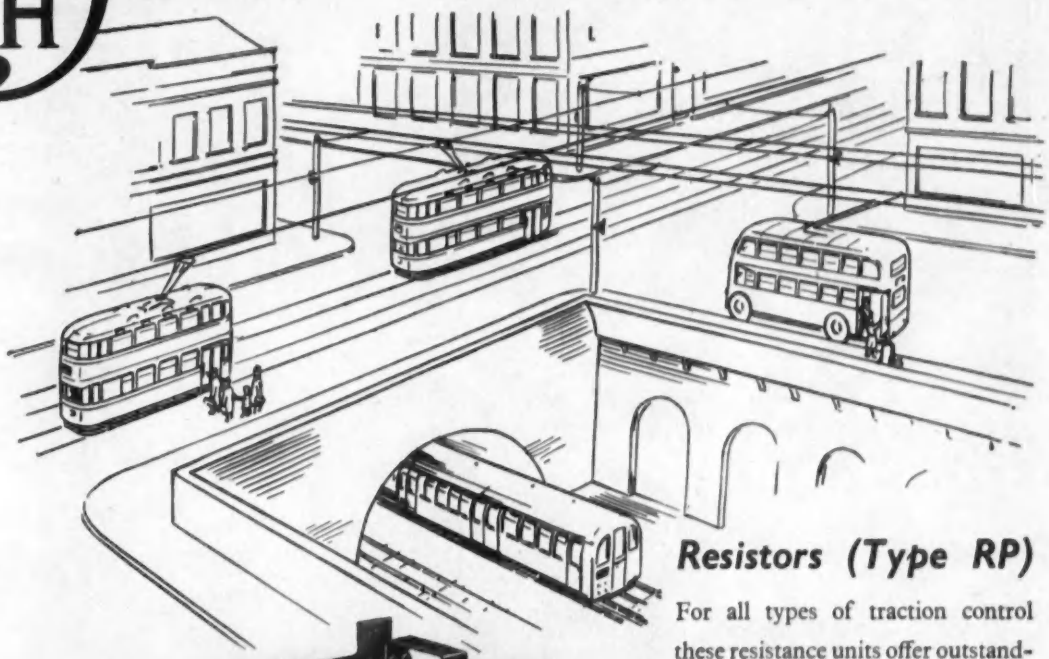
ELECO

ENGINEERING & LIGHTING EQUIPMENT CO. LTD.

SPHERE WORKS, ST. ALBANS, HERTS.

B T-H

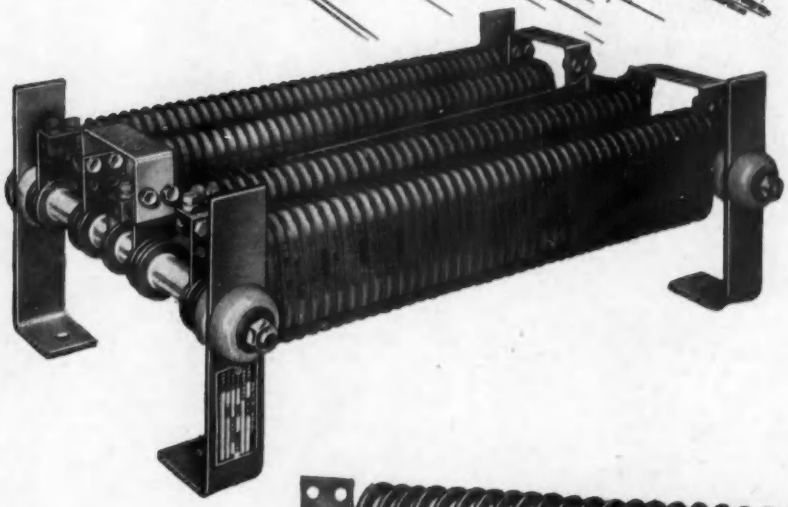
Electric Traction Equipment

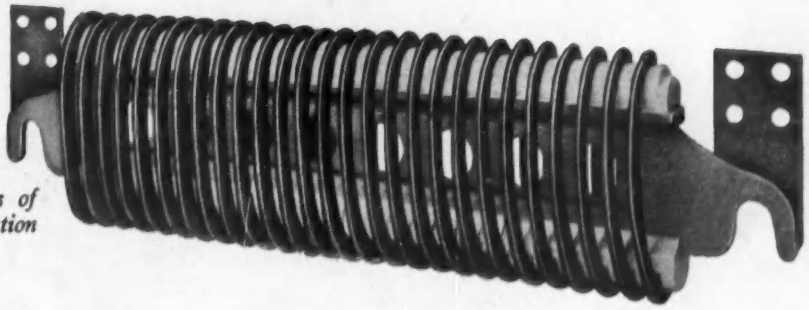


Resistors (Type RP)

For all types of traction control these resistance units offer outstanding advantages.

- Non - corrodible, chromium alloy steel.
- Edgewise-wound strip of liberal section and high specific resistance.
- Mounted on steatite spacers.
- Will withstand heavy overloads and high operating temperatures.





BTH manufacture all types of electric equipment for traction purposes.

THE
BRITISH THOMSON-HOUSTON
COMPANY LIMITED, RUGBY, ENGLAND

Member of the AEI group of companies

A4410

ELECTRICAL ENGINEERS EXHIBITION Visit our STAND No. 71

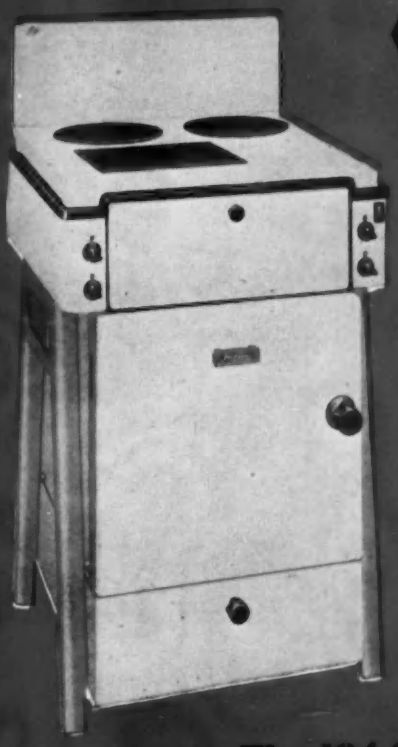
Jackson attractions...

The 'Cookalone' Auto Control Unit

A boon to the busy housewife and priced within reach of all. The new Jackson 'COOKALONE' is an efficient and reliable control unit that will provide a total delay period of 18 hours from setting to completion of cooking. It also incorporates a 'COOKALARM'—which gives a reminder ring for periods up to 4 hours.
The Jackson 'COOKALONE' can be fitted to all thermostatically controlled Jackson Electric Cookers.
190 Series £11.5.0d. 290 Series £12.5.0d.
Supplied complete with tubular support fittings.

...for satisfaction

...for the Ideal Home!



The New 295

Another addition to the 290 series—designed for the bigger sized family. Incorporates a large hob with two 8" boiling plates and grill boiler. Higher and wider oven, to meet 'big family' demands. Rollers on legs for easy movement; light-weight lift off hob; built-in drying rails; spacious hot-cupboard; storage drawer—removable for easy cleaning underneath. Leg Model £30.10.0d. Drawer Model £31.10.0d.

The 194 Cooker New features

The famous 192 and 194 Jackson Cookers now feature a new-styled 'Clear-View' Glass Oven Door. Full size outer door closes neatly over whole area. Matching switch knobs with polished metal inserts and bezel surrounds. All Cream finish interior to hot-cupboard. No increase in price. Model 194—shown fitted with 'COOKALONE' Auto Control Unit.

...sell them Jackson

THE JACKSON ELECTRIC STOVE CO. LTD., 141 Sloane St., London, S.W.1.

ALUMINIUM AT WORK

From the familiar . . . . . to the less familiar

Wherever there is movement there is a need for less weight. That is why aluminium is chosen for the hard-working pistons of the world's engines. Its lightness and durability have made a vital contribution to the development of engines giving higher power for less weight. And now aluminium is raising the limiting factor of weight in many kinds of electrical apparatus. For example, by lightening the windings of great alternators, aluminium allows size to be increased—and more power can be made from every ton of coal.

Aluminium Union Limited

(Incorporated in Canada)

THE ADELPHI, JOHN ADAM STREET, LONDON, W.C.2. *An ALUMINIUM LIMITED Company*

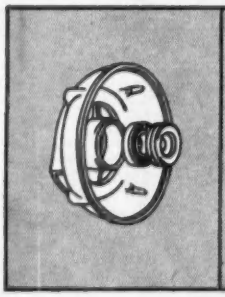
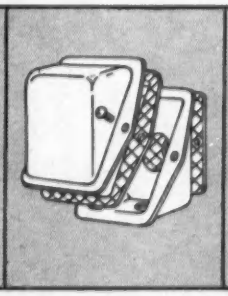
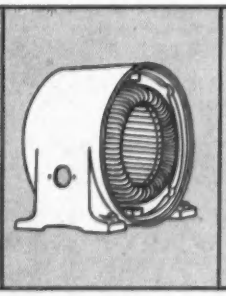
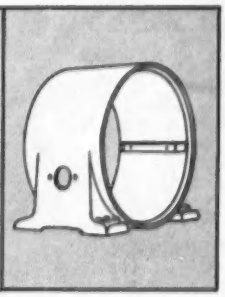
OFFICES, ASSOCIATED COMPANIES AND AGENTS THROUGHOUT THE WORLD

6

FACTS ABOUT ELECTRIC MOTORS

BROOK MOTORS Ltd

STURDILY BUILT
ECONOMICAL IN COST
INTERCHANGEABLE WITH FAN COOLED TYPES

BEARINGS	TERMINAL BOX	PROTECTION	STATOR	FRAMES
				
Oversize metric bearings. Sealed lubrication.	Pressed steel box, split diagonally for easy access. Cable entry may be turned to four alternative positions.	Drip-proof end-shields protect windings. Splash proof baffles may be fitted if required.	Dipped and baked several times to give tough protection to windings.	Rigid cast iron. Designed to hold bearing alignment and prevent distortion under normal operating conditions.

BROOK MOTORS LIMITED
HUDDERSFIELD

55/1

'ENGLISH ELECTRIC'

important additions

to the range of 'Superform'
distribution equipment
will be on display at

THE ELECTRICAL ENGINEERS EXHIBITION

EARLS COURT

MARCH 15th–19th, 1955

We cordially invite you to visit our

STAND No. 41

where a staff of Technical Engineers

will be in attendance.

THE ENGLISH ELECTRIC COMPANY LIMITED, QUEENS HOUSE, KINGSWAY, LONDON, W.C.2

Fusegear Works, East Lancashire Road, Liverpool 10

WORKS: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL · ACCRINGTON

FG.23C5

8,000,000 lbs.* of steam per hour

During 1954, International Combustion supplied firing equipment with a total generating capacity of over 8,000,000 lb. of steam per hour to electricity generating stations of the B.E.A.

With their vast experience gained in so many important undertakings, International Combustion are foremost in the design and manufacture of the most advanced steam raising plant for large or small installations

* Based on published figures of plant commissioned by British Electricity Authority in 1954.

Enterprising Engineering by

THE INTERNATIONAL COMBUSTION GROUP OF COMPANIES

IC

comprising

INTERNATIONAL COMBUSTION LIMITED
INTERNATIONAL COMBUSTION PRODUCTS LTD.
INTERNATIONAL COMBUSTION (EXPORT) LTD.
RILEY STOKER COMPANY LIMITED

London Office: Nineteen Woburn Place, W.C.1. Tel. TERminus 2833. Works: Derby, England; Port Elizabeth, South Africa; Sydney, Australia

FB 9011

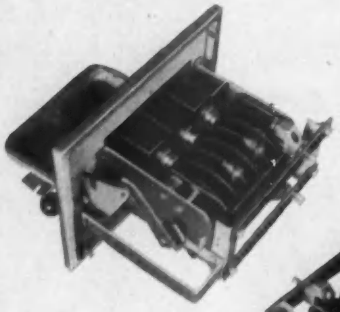
CANTIE

MINUNIT

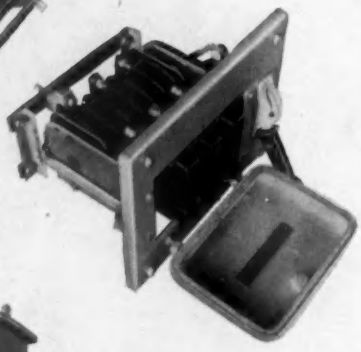
SWITCHES & SWITCHFUSES

Cubicle Switchboards built up the Cantie "Minunit" way are always neat, always complete—yet they can be modified or extended at any time—easily and economically.

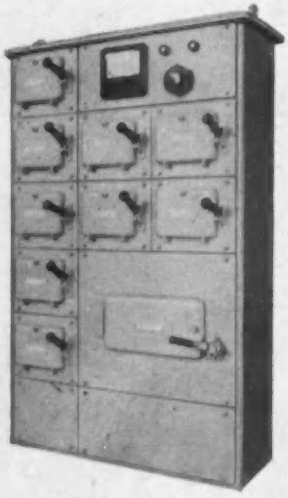
Architects and engineers appreciate the space economy, flexibility and efficient appearance of "Minunit" Switchboards, and recognise that behind the clean flush-fronted lines of this modern equipment there are housed meticulously engineered, dependable components designed for long and trouble-free service. This is why more and more Cantie "Minunit" gear is being specified for installation all over the country.



"Minunit" Cubicle mounting switchfuses up to 4-pole 60 amps. rating are identical in overall size and fit into the standard single unit aperture.



The illustrations show the 60 amps. "Minunit" switch-fuse. Any one of these units can be removed for servicing without interrupting other circuits.



The adjacent illustration shows a "Minunit" Cubicle-type Sub-Main Switchboard—one of a number built for installation on board ship—comprising nine rotary switch-fuses, capacity 15/60 amps., one knife-type Cubicle Switchfuse, capacity 100/500 amps, embodying bolt lock mechanism.

WRITE TODAY FOR DESCRIPTIVE LEAFLET ON "MINUNIT" CUBICLE SWITCH-BOARDS AND "MINUNIT" COMPONENTS

CUBICLE SWITCHBOARDS

CANTIE SWITCHES LTD.

PORT CAUSEWAY, NEW FERRY, BIRKENHEAD

Telephone: BROMBOROUGH 1227

A METAL INDUSTRIES GROUP COMPANY

M

CS7

"LET'S CALL IN THE LIVELY LADS AT LORIVAL!"

When it comes to plastics,
enterprising manufacturers leave it to Lorival.
They're lively lads at Lorival.
And they've got what it takes to produce
mouldings of high quality in large quantities
at low prices. Consider the following
facts ... then - call in
Lorival's lively lads!

LS7

Plant — Lorival's moulding shop is one of the largest and most modern in the country. Under one roof a complete range of presses moulds practically all the plastic materials.

Tools — Mouldings can't be better than the tools that produce them. Lorival employ many of the finest designers and toolmakers in the business.

Costs — Constant output — Lorival work a three-shifts production of 100 hours a week—lowers costs, speeds delivery.

Clients — Lorival serve many well-known manufacturers, among whom are included Pye, Hotpoint, Ever Ready, Simplex, Skefko and Exide. A longer list would contain leading firms in such fields as textile machinery, motor cars, agricultural machines, instruments, display and packaging, etc.

LORIVAL PLASTICS

UNITED EBONITE AND LORIVAL LTD., LITTLE LEVER, NR. BOLTON, LANCS.

'CORRILUX'

—ideal lighting fitting for indoors—because of its excellent appearance; and for outdoors—because the Corrilux is completely weatherproof, will not corrode and is of great strength

LOWEST PRICED 27/- 100w BULKHEAD FITTING

Exceptional strength body made of corrosion-resisting aluminium alloy, frosted finish

Excellent light distribution

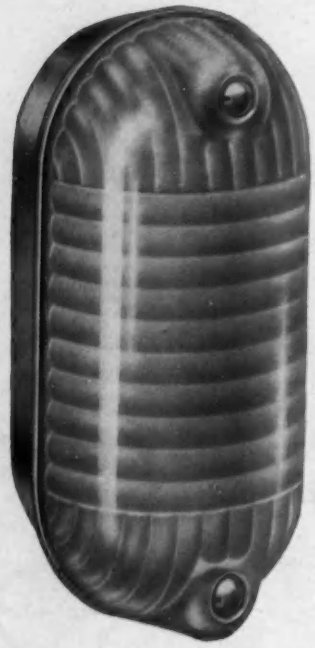
Really attractive appearance and finish

Simple installation—simple maintenance

Completely weatherproof

Better glass mounting 1-piece internally frosted glass of great strength, mounted on non-intercellular rubber gasket

2" centre knockouts and 2 brick-width knockouts for fixing screws



Five ¾" knockout conduit positions

Sealing compound for conduit entry supplied with each fitting

BC lampholder (porcelain) with each Corrilux

Alternative fixing for lampholder position

Holds any lamp up to 100W

Surface or semi-recessed

Through wiring A suitable length of fibreglass sleeving is supplied to protect cables

2 secret key screws retain glass. Easily fixed replacement glasses are supplied with captive screws

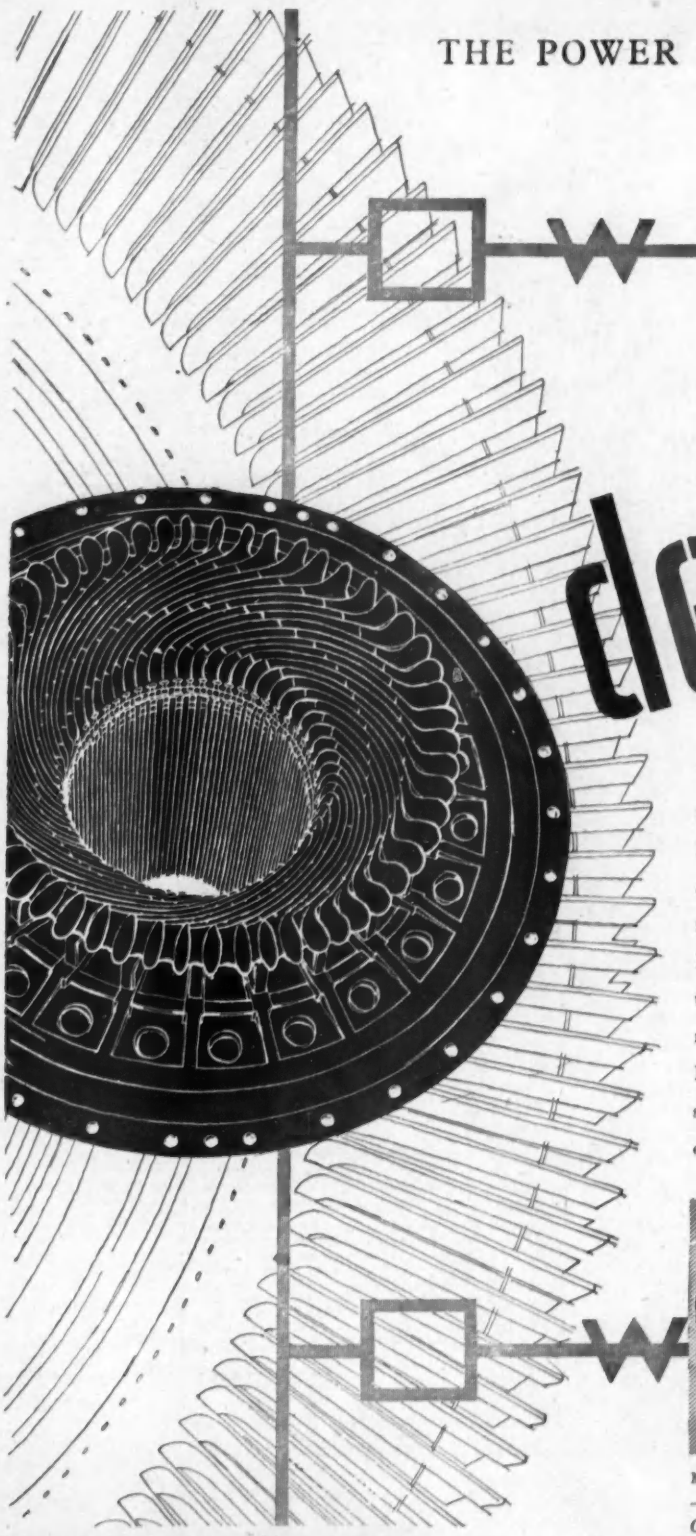
For passages, corridors, doorways, staircases, toilets, under canopies, and all outbuildings on the farm

MADE BY THE HOUSE OF Simplex

Simplex Electric Co Ltd Blythe Bridge Stoke-on-Trent
London Showrooms: 217-19 Tottenham Court Rd London WC1

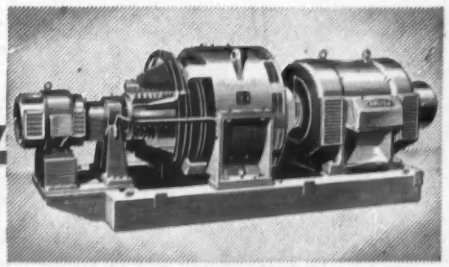
A TI COMPANY

THE POWER BEHIND BRUSH...



design

Brush design engineers are constantly devising new and better ways of putting power into harness. Every Brush Power unit is designed *exactly* to do a job perfectly–if needs be 'tailor made' to a particular customer's requirements. Moreover, Brush Products are always designed to meet the maximum stress of their service life–not just to fill the requirements of a specification. In other words, it is creative design plus extra strength and *stamina* that makes Brush Power equipment famous throughout the world.



MOTOR GENERATOR SET *for High Duty Alloys Limited –190 H.P. 400/440 volts, 233 amperes–980 r.p.m. TR.544 Generator–120 kW 60 volts–2000 amperes–980 r.p.m.*

Whatever your power problem...consult

BRUSH

Visit Stand No. 70 Electrical Engineers' Exhibition Earls Court March 15 - 19

TRANSFORMERS · SWITCHGEAR · MOTORS · ALTERNATORS · GENERATORS · TURBINES

BRUSH ELECTRICAL ENGINEERING CO. LTD., *Loughborough, England · Member of the Brush Group* BRUSH

C

Model 8 UNIVERSAL AVOMETER

20,000 ohms per volt *plus* AUTOMATIC Overload Protection

Produced in response to a demand for a high sensitivity version of the world-famous Universal AvoMeter, this model incorporates the traditional design features of its predecessors, so highly valued for simplicity of operation and compact portability.

It has a sensitivity of 20,000 ohms per volt on all D.C. voltage ranges and 1,000 ohms per volt on A.C. ranges from 100 V upwards. A decibel scale is provided for audio frequency tests. In addition, a press button has been incorporated which reverses the direction of current through the moving coil, and thus obviates the inconvenience of changing over test leads when the current direction reverses. It also simplifies the testing of potentials, both positive and negative, about a common reference point. A wide range of resistance measurements can be made using internal batteries, separate zero adjustment being provided for each range.

It is of importance to note that this model incorporates the "AVO" automatic cut-out for protection against inadvertent overloads.

Size 8¼" x 7¼" x 4½"
Weight 6½lbs. (including leads)

£23 : 10s.

For your Valve Characteristic Meter or Valve Tester

Owing to the very large number of valves which have been issued within the last two years, no further amendments will be issued for the original "AVO" Valve Testing Manual. A new, completely revised and fully up-to-date Valve Data Manual is now available from the Company at 15/- post free.

D.C. VOLTAGE	D.C. CURRENT	A.C. VOLTAGE	A.C. CURRENT	RESISTANCE
2·5V.	50μA.	2·5V.	100mA.	*First indication* 0·5Ω.
10V.	250μA.	10V.	1A.	*Maximum indication* 20MΩ.
25V.	1mA.	25V.	2·5A.	0—2,000Ω { using internal batteries.
100V.	10mA.	100V.	10A.	0—200,000Ω { using internal batteries.
250V.	100mA.	250V	—	0—20Ω { using internal batteries.
1,000V.	1A.	1,000V.	—	0—200MΩ { using external batteries.
2,500V.	10A.	2,500V.	—	

THE AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT CO. LTD.
WINDER HOUSE · DOUGLAS STREET · LONDON S.W.1 *Telephone* VICtoria 3404—9

Wire

Let us admit that this bears little resemblance to an advertisement. The artist said he couldn't draw wire! We can. We draw hundreds of miles of it—Copper Wire, plain and tinned and drawn to very exacting specifications, inch by perfect inch.

Without harping on it, we believe that a very large number of our friends in the Electrical Trade know what we do and have complete confidence in our products.

Write to us—but not about harps, please. Telephone: Abbey 2771.

R. H. SYMONDS LTD.

47, VICTORIA ST., LONDON, S.W.1.

Ω the finish is often the beginning of better production and bigger business

The good product deserves the finest finish and specialized metal finishing can open the door to improved manufacturing technique and greater economy. In all products of aluminium and its alloys, the surface can be given a hard anti-corrosive, anti-abrasive treatment and if a colour finish is required the colour is deep and lasting throughout the full textile range of dyes.

These famous finishes have been subjected to the most cruel testing in Government Laboratories and have proved their worth. We have many years of aluminium anodizing experience to place at your disposal and a number of highly successful patented processes for all types of metal finishing—and that makes a very sound beginning to any project. We were the first to introduce eight of the major finishing processes in this country and have remained first at every progressive step—why not consult our Technical Sales Manager ? His telephone extension is 14.

Four of our Patented Processes:

ALUMILITE

An electrolytic process for producing extremely hard and protective coatings on aluminium and aluminium alloys for all service conditions. The minute porosity of the film enables it to be impregnated with an attractive range of colours, which are subsequently made permanent by a special sealing process.

ALZAK

An electrolytic process for producing bright reflecting surfaces on super purity aluminium. This patented process enables a transparent Alumilite anodic film of hard adherent and protective quality to be applied without loss of brilliance.

ALPOL

A chemical immersion process for producing bright surfaces on commercial aluminium. The product can be specially treated by the Alumilite process to prevent tarnishing or to obtain a bright coloured finish.

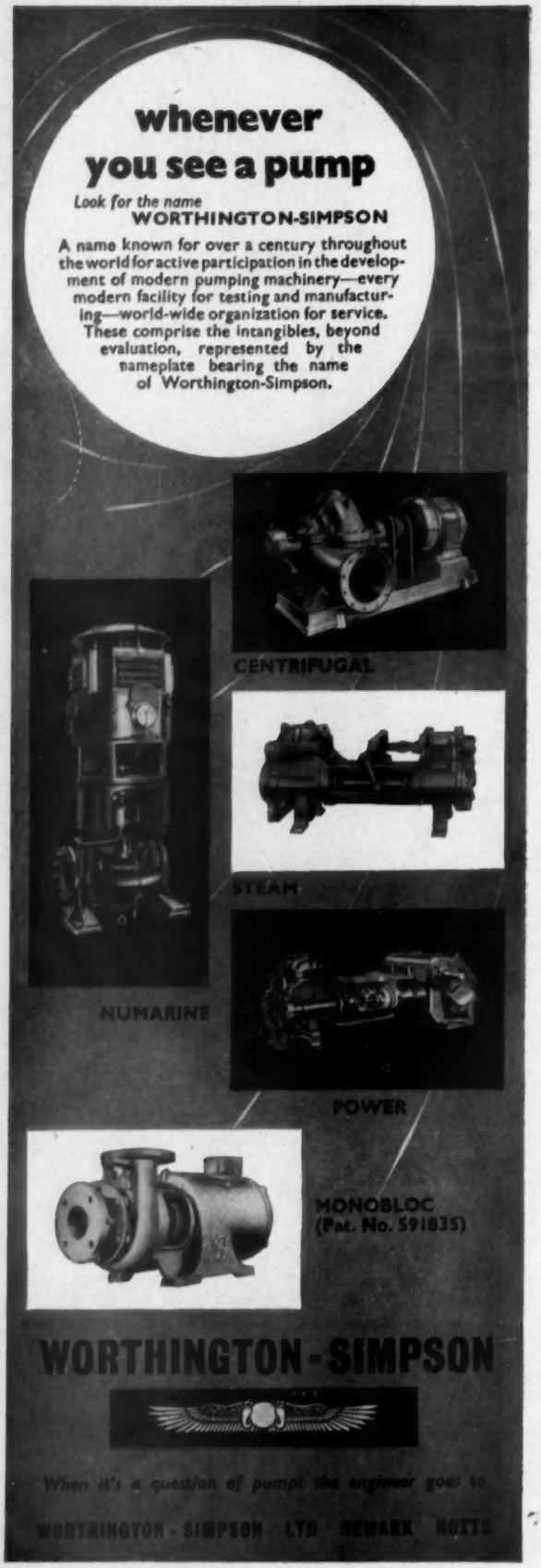
ENAMEL PLATE

"Our latest electrolytic process for producing on aluminium a hard, opaque porcelain finish in a range of seven pastel shades. The surface is resistant to all beverages—including spirits—cosmetics, perfumes and toilet preparations and will in no circumstances chip, flake or burn."

ALUMILITE AND ALZAK LIMITED

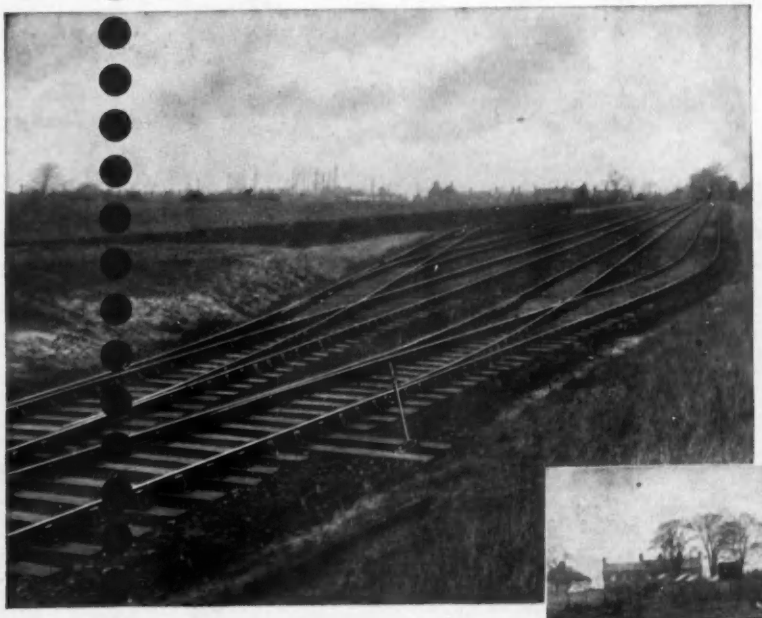
PRIORY WORKS, MERTON ABBEY, LONDON, S.W.19

TEL: LIBERTY 7641 GRAMS ALUMILITED WIMBLE LONDON


whenever you see a pump
Look for the name
WORTHINGTON-SIMPSON
A name known for over a century throughout the world for active participation in the development of modern pumping machinery—every modern facility for testing and manufacturing—world-wide organization for service. These comprise the intangibles, beyond evaluation, represented by the nameplate bearing the name of Worthington-Simpson.
CENTRIFUGAL
STEAM
NUMARINE
POWER
MONOBLOC (Pat. No. 591835)
WORTHINGTON-SIMPSON
When it's a question of pumps the engineer goes to
WORTHINGTON-SIMPSON LTD NEWARK NOTTS

WARDS *for Railway Sidings*

The service offered to industry by Wards is backed by the experience of over half a century, and covers every aspect of railway siding planning, construction and maintenance, including earth moving and site preparation.



The accompanying photographs show sections of a recently completed "Ward-built" siding.

Copies of the third edition of our booklet "Rails and Rail Accessories" forwarded on request.

COLLIERIES
REFINERIES
POWER STATIONS
GAS WORKS
BREWERIES
Ddocks, etc., etc.

TWW *The Railway Siding Consultants and Contractors*

THOS. W. WARD LTD · ALBION WORKS · SHEFFIELD

TELEPHONE: 26311 (22 LINES) · TELEGRAMS: "FORWARD · SHEFFIELD"

LONDON OFFICE: BRETTENHAM HOUSE · LANCASTER PLACE · STRAND · W.C.2

For full details of Westalite rectifier units please write stating requirements to: **DEPT. E.T.7**
WESTINGHOUSE BRAKE & SIGNAL CO. LTD.
82 York Way, King's Cross, London, N.1 *TERminus 6432*

WESTALITE RECTIFIERS TYPE 12

Next Smaller, see D.S. 403 — Data Sheet 412, 1st Edition

VOLTAGE RATINGS Per series element. Maximum peak reverse: 42 volts.
Ratings in various circuits with sinusoidal input.

Circuit	Load	Max. D.C. R.M.S. Input	Nominal Mean Output
1 Phase bridge	Resistive	17·1 volts	12 volts
" "	Battery; AC res. ballast	18·0 volts	12 volts
" "	Battery; DC res. ballast	17·1 volts	12 volts
" "	Battery; choke ballast	20 volts	12 volts
" "	Battery; choke ballast	20 volts/line	12 volts
DC Stopper	Resistive	17·1 volts/line	16 volts
" "	Resistive	15 volts DC	18·5 volts

MOUNTING DETAILS
12A, 12L spindles horizontal, but not more than two horizontal layers.

WESTALITE RECTIFIERS TYPE 2

Next Smaller, see D.S. 403 — Data Sheet 402, 1st Edition

VOLTAGE RATINGS Per series element. Maximum peak reverse: 24·3 volts.
Ratings in various circuits with sinusoidal input.

Circuit	Load	Max. D.C. R.M.S. Input	Nominal Mean Output
1 Phase bridge	Resistive	17·1 volts	12 volts
" "	Battery; AC res. ballast	18·0 volts	12 volts
" "	Battery; DC res. ballast	17·1 volts	12 volts
" "	Battery; choke ballast	20 volts	12 volts
" "	Battery; choke ballast	20 volts/line	12 volts
DC Stopper	Resistive	17·1 volts/line	16 volts
" "	Resistive	15 volts DC	18·5 volts

MOUNTING DETAILS
2A, 2L spindles horizontal, but not more than two horizontal layers.

PARALLEL PATHS
Number of parallel paths unrestricted for 2A.
Not more than 1 path of 2L is economical electrically, unless space restrictions arise or unit is oil cooled.

402

CURRENT RATINGS Per parallel path tampered mean

Type	Non-preferred type 2L				Preferred type 2A			
Ambient C: average	25	35	45	55	25	35	45	55
maximum	35	45	55	55	35	45	55	55
Single-phase bridge: res. load	2·0	1·6	0·8	—	6·0	5·0	3·6	2·0
Single-phase bridge: batt. choke ballast	1·6	1·28	0·64	—	4·8	4·0	2·88	1·6
Three-phase bridge: batt. res. ballast	3·4	2·2	1·5	—	8·0	6·0	5·0	2·9
Three-phase bridge: res. or batt. load	2·2	1·7	1·2	0·6	5·75	4·5	3·5	2·0
DC Stopper								

412

DIMENSIONS and WEIGHTS (Approximate)
Cat. No. appears on the positive end, except when both ends are negative.
Spindle ½" Whitworth projecting 1" (16 mm) each end.
Effective area of element = 48 sq. cms.

Type 2L

FIG. 1.

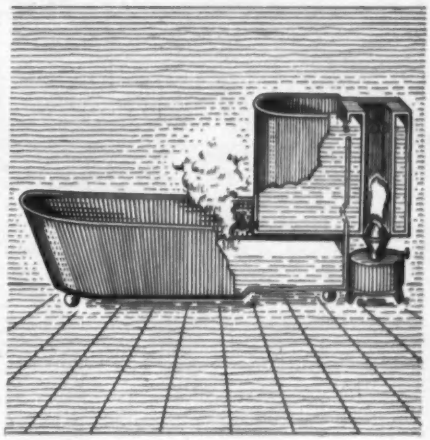
Type 2A

Overall size	2L	2A
Maximum number of elements	3" (76 mm) sq. 54	6" (152 mm) sq. 42
In the following formulae N = Total number of discs used.		
Length (ins.)	1·6	
" (mms)		
Weight (lbs.)		
" (grms.)		

A after 9 elements.

4/5 6433

Progress in design



Since the early days of domestic heating a great deal of progress has been made. Research on the production of better heating elements has led to the Brightray series of nickel-chromium resistance materials—outstandingly reliable, and with special grades to suit all domestic and industrial applications. Let us help you select the one most suitable for *your* requirements.

BRIGHTRAY C for intermittent heating and cooling cycles up to 1150°C: particularly suitable for fires, irons, cookers, heating plates, etc.

BRIGHTRAY S for electric furnace elements working almost continuously at temperatures up to 1150°C.

BRIGHTRAY B for all types of elements where temperature does not exceed 950°C.

BRIGHTRAY F for furnace elements operating in a carburising atmosphere not above 1000°C.

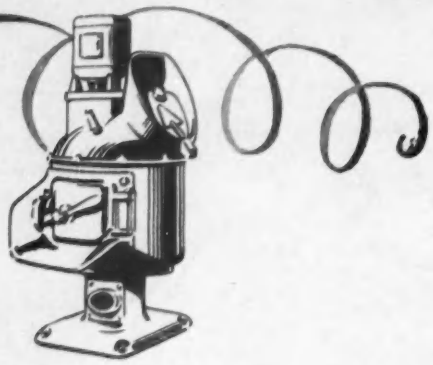
WOULD YOU LIKE A HANDBOOK . . .

containing complete data on our electrical resistance materials? We will gladly send it free of charge on hearing from you on your business letterhead.

BRIGHTRAY for reliable HEATING ELEMENTS

'Brightray' is a registered trade mark.

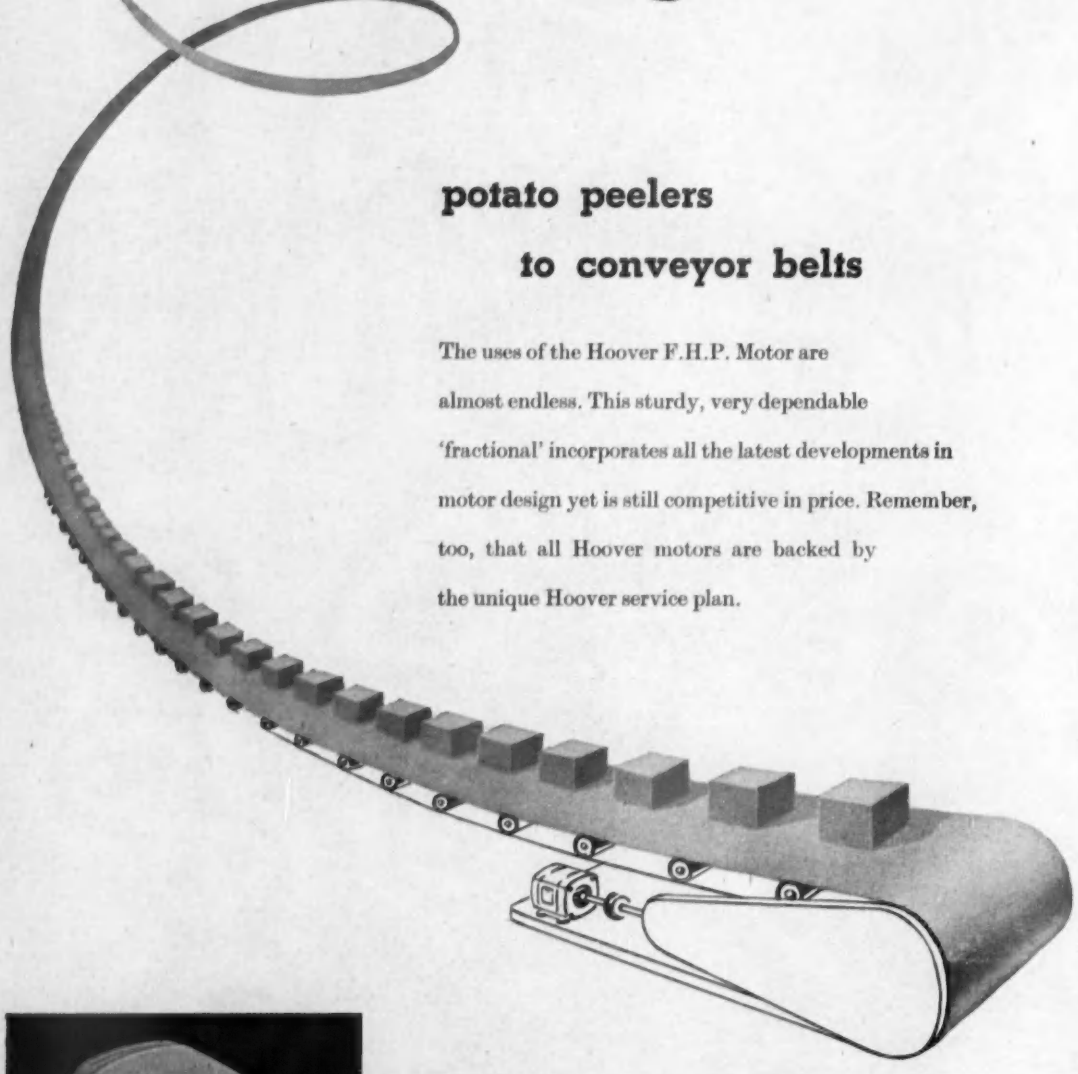
HENRY WIGGIN AND COMPANY LIMITED · WIGGIN STREET · BIRMINGHAM · 16

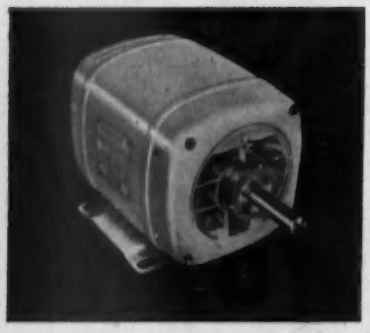


potato peelers

to conveyor belts

The uses of the Hoover F.H.P. Motor are almost endless. This sturdy, very dependable 'fractional' incorporates all the latest developments in motor design yet is still competitive in price. Remember, too, that all Hoover motors are backed by the unique Hoover service plan.





HOOVER LIMITED

Industrial Products Department
Cambuslang · Lanarkshire · Scotland

ELECTRICAL TIMES

THURSDAY, 3 MARCH, 1955
Volume No. 127 Number 3304
REGISTERED AS A NEWSPAPER

ESTABLISHED 1891

SARDINIA HOUSE, SARDINIA STREET, LONDON, W.C.2
Telegrams: Equivolt, Estrand
Telephone: HOLborn 6016

Editor and Managing Director:
ROY BALDWIN, M.I.E.E., Barrister-at-Law

Assistant Editors:
J. K. JOHNSON, B.SC.(ENG.), A.M.I.E.E.
K. C. POUNDS, B.SC.(ENG.), A.C.G.I., A.M.I.E.E.

In This Issue

Electricity Serves a Modern Hotel 343
Coventry's New Hotel 348
High Voltage Transmission in Sweden ... 349
Power Export from Yugoslavia 350
Engineering as a Profession 351
Readers' Views 352
Extensions to Southall Technical College 352
Around the Trade *by Peregrin* 353
Gracious Living on View 354
Wind Power in Somaliland 358
Engineering at Harwell 358
Lighting a Steelworks 359
Overseas News 360
Personalities in the Industry 362
British Standards 364
Problems and Practice in Engineering ... 365
Equipment for Industry 366
For the Electrical Trade 367
Sales Development in Queensland 368
Brazil's New Hydro-Plant Project 368
News of the Week 369
Questions in Parliament 373
Electric Supply News 374
Company Activities 375
Commercial Information 376
Classified Advertisements 47
Index to Advertisers 56

SUBSCRIPTION RATES

United Kingdom and Overseas £3. 3s. 0d. per annum. Canada $9. U.S.A. $9 per annum. Subscriptions are payable in advance and may commence with any issue throughout the year. Overseas subscriptions may be paid to The Electrical Times Limited by banker's draft, cheque, international money order, or by UNESCO book coupons. Single copies price 1s. each.

D

EXHIBITION COMPLEX

The electrical industry has never been over fond of Birmingham as an exhibition centre and in the face of post-war competition has definitely found it wanting. For years the electrical section of the B.I.F. has been slowly dying and now that the first stages of rigor mortis are setting in, even the Birmingham Chamber of Commerce have come to realise they cannot continue to hold on to something that is no longer there. If the section had been moved to London immediately after the war there might have been a different story to tell. Is it too late to make a change? That is a question that the B.I.F. under its entirely new management is posing and shortly a referendum will be taken of the views of the electrical industry on such a move. The questionnaire will be sent out under the joint signatures of the B.I.F. and the Chamber of Commerce, so should the response be favourable, presumably there will be no opposition from Birmingham to an electrical section in London. But a mere change of venue will not be enough, a complete blood transfusion will be required. Not only has there been an increase in the number of specialist exhibitions but the Electrical Engineers' Exhibition, which opens this month, has broadened out from its original concept of a direct appeal to engineers, into a display far more general in character. Nevertheless it has retained that air of friendliness of an industry's own private party. It is not, however, an exhibition which reflects the full stature of the industry in world trade. While it might in time eventually come to fill such a role, despite those askance glances from Beama, it cannot be gainsaid that an international standing will be more quickly achieved under the umbrella of a broadly based horizontal exhibition of the B.I.F. type. Whether a new electrical section in London will be effective in attracting alike the heavy plant manufacturers as well as the light, the overseas buyers as well as the home, is dangerous to forecast, particularly as consideration may be given to holding the Fair earlier in the year. What is certain if this new proposal is adopted, the industry will be faced with two exhibitions, timed within a short space of each other and although they may have different engineering appeals, they must of necessity cover certain common ground, so that the whole situation becomes fraught with the danger of falling between two stools. Experience shows, however, that exhibitions are not created, they have to evolve; so whatever the result of the referendum, we will still be far from obtaining a showplace worthy of the second largest exporting industry of the country.

Electricity Supply Handbook

The 1955 edition is now available. Completely revised and enlarged, a new 23" x 15" coloured map of the transmission network is included. Copies price 7/6 each may be obtained from the Offices of the 'Electrical Times'.

SETBACK FOR COOKERS

Most retailers appear to have accepted the new Hire Purchase Regulations with a fair degree of equanimity. The new terms are not far removed from what has been accepted as good practice by most electrical dealers, and these are given protection from the competition of long-term no-deposit dealers. Moreover, the new regulations do not discriminate against electrical appliances as did the earlier hire purchase orders. For electricity boards, however, the inclusion of cookers in the regulations will mean a major reconsideration of commercial policy. Cookers—and much the same story applies to water heaters—are so essential an element in the task of building up domestic demand and improving the load factor, that it has been considered reasonable by many boards to offer them on very long term hire-purchase agreements. Five years has been the practice of the more conservative boards but at the other end of the scale has come a 15-year term of repayment. Moreover, the effectiveness of the longer repayment periods in boosting sales has been demonstrated many times by the upsurge in orders that has followed a board's announcement of a change to a new long period. A serious fall in business must therefore be expected now, though the wide coverage of the regulations, which restrict competing claims for available cash, may moderate the drop. To the electricity supply economy, however, it remains as important as ever to increase the use of the larger domestic appliances. The occasion is one for re-examining the claims of simple hire, though the dearer money policy is a difficulty here; certainly, there should be more attention to publicity, in order that the claims of electricity for the available cash shall not be overlooked.

PROFESSIONAL CONTENT

Speeches at Thursday's annual dinner of the Institution of Electrical Engineers concentrated in the main on engineering's claim to the rank and dignity of a profession. In doing so, they revealed incidentally, some of the difficult problems of applying the traditional standards of professional status in this field. Members and their guests were doubtlessly sympathetic to the exhortations of the Master of the Rolls, who with learned eloquence called on them to place their duty to their profession, and through that to mankind in general, above all other considerations. They listened with approval as well to Mr Eccles their president, following the same lines and remarking on the necessity of maintaining professional educational standards. It may have been difficult, however, to match with these speeches Mr H. Bishop's understandable mention of the Institution as "closely allied to the trade associations," in the task of public relations work. Here is the nub of the difficulty of the engineer as a professional man on the conventional pattern. Engineers are intimately concerned with trade matters and cost-consciousness is an essential element of their make-up in a way that applies to none of the older professions. Thus, to extend to the engineer all their characteristics is doomed to failure. Care needs to be taken that the attempt to apply most of the older requirements does not exclude too many able men for merely formal reasons.

DESERT WINDS

Discussion on the use in remote areas of auxiliary sources of energy such as wind-power, solar energy and waste vegetation is usually conducted on a hypothetical basis. There is, in contrast, an immediate object in view in the report which Mr E. W. Golding and a colleague have made on the energy resources of British Somaliland, and which is summarised on a later page of this issue. Semi-desert conditions and a nomadic population predominantly engaged in stock herding, combine with transport difficulties to give a situation in which there is little chance of imported fuels playing an effective part in raising living standards. With no indigenous coal or oil, there remain only occasional winds of useable force, strong tropical sunshine and waste vegetation as the possible starting point in increasing energy application. The report does not, disappointingly, hold out any hope of these auxiliary sources being so developed at an early date that they will transform the country's economy; but it does suggest that they might give initial means for improvement. In particular, the use of windmill-driven electric generators may lay the foundation for agricultural advances, helped by recent improvements in the design of light steam engines.

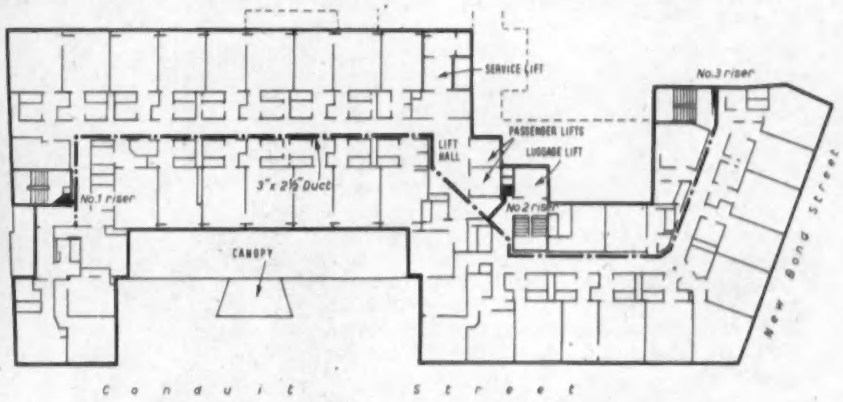
D.C. FOR POWER TRANSMISSION

The inauguration of the 380 kV Swedish power system some four years ago marked at that time a new era in bulk power transmission technology. Now, investigations are in hand on even higher voltages up to 650 kV a.c. Simultaneously, a theoretical attack is being launched on the possibility of direct current transmission at ±400 kV to earth. Confidence in the efficiency of h.v., d.c. stems from the satisfactory performance of the Sweden-Gotland submarine link which has been operating for the past year. Mr Ake Rusck, president of the Swedish State Power Board emphasised in his recent lecture to the I.E.E. that, in his view, the problems of h.v., d.c. transmissions may now be considered as solved. Such a statement from an engineer of Mr Rusck's standing cannot be lightly disregarded, nor can his estimate that a d.c. submarine link from Britain to France using high-voltage d.c. at 200 kV would work out at about £18/kW for a 100 MW scheme in comparison with the cost of £43/kW quoted for the 132 kV a.c. 100 MW cross-channel link. Without a detailed breakdown of the figures of both systems, it is difficult to account for such a wide difference. But the Swedish State Power Board is at the moment in the position of having the best, if not the only, commercial data on d.c. transmission in its possession.

Meteor

Electricity serves a Modern Hotel

EXTENSIVE INSTALLATION INTRODUCES NOVEL PRACTICES



A HOTEL is judged, not only by the standard of service it provides, but equally by the quality of its services in ensuring that residents enjoy maximum comfort and convenience. In accomplishing this end, the electrical installation plays a leading role, providing supplies for purposes ranging in diversity from motive power to call signs, whilst its design calls for careful attention to the numerous details involved. When these aspects are allied to modern practice, the result makes for useful study. Such a case is provided by the installation in a new hotel in London, where considerable use has been made of modern wiring techniques. Since the hotel—"The Westbury," in Bond Street—is catering particularly for Americans visiting this country, its services must necessarily attain the high standard to which such residents will have become accustomed in their own country. Moreover, as it was felt that residents would prefer to receive visitors in the privacy of their rooms, bedrooms are accordingly designed to act as reception rooms, requiring correspondingly more facilities. This factor has also influenced building design on the ground floor, minimising the provision for main reception rooms and lounges.

Opened last Tuesday, the hotel stands at the south side of the corner of Bond Street and Conduit Street, the main entrance and drive-in being situated off the latter road. It is a nine storey building, of reinforced concrete framework in with main walls of brick and floors of concrete cast *in situ*. Partition walls are almost invariably of foam slag block construction. A notable feature is seen in ground floor building front facing Bond Street which has been set back from the pavement to form an arcade below the upper floors of the hotel. This will enable the pavement outside the building line to be removed thus effecting a widening of Bond Street by the side of the hotel.

For the electrical installation, the main intake is a 415 V, 3-phase 50 c/s supply provided over two sets of four 0·3 sq in. p.i.l.c.s.w.a.s. cables from the London Electricity Board's transforming substation in the hotel basement. This room backs the main switch room, the two cables being taken through the wall direct to the switchboard. As shown in the diagrammatic outline of the installation, Fig. 8, each incoming cable terminates in a 400 A isolator feeding the busbars of the main board. This arrangement ensures that should one supply fail, an alternative is immediately available.

Fig. 1. (right) A plan of the first floor of the hotel, shown above indicates the position of rising mains, corridor trunking and lifts; and Fig. 2 an illustration of the restaurant lighting which employs these graceful 8 lamp chandeliers

It can be seen from Fig. 8, that the board has only one set of bars, to which each incoming switch is connected. It is, however, arranged with links for use if necessary. Shown in Fig. 12, the switchboard is the standard cubicle unit supplied by Varilectric Ltd. and completely occupies one side of the switch room. Cable connections have therefore to be made through the front of the board, with "Pyrotenax" m.i.c.s. cables used for all main supplies taken from it.

Distribution Arrangement

These supplies are arranged on a radial system, and first attention is given to the feeds for the hotel suites, occupying the first to seventh floors. For this purpose, there are three main 3-phase risers, each comprising three, 0·1 sq in. and one, 0·06 sq in. single core, m.i.c.s. cables supplied from the main bars through a 200 amp t.p.n. fused switch. From the main board they are run on the surface to the three main rising ducts, located adjacent to each of the three staircases. Their position is shown in the view of the first floor plan in Fig. 1.

On each floor, the riser terminates in a special combined tee-off box and dis-board of Troughton and Young's own design, and is then carried upward to the next floor. The link from this tee-off comprises a pair of cables taken from the appropriate phase conductor (it differs from floor to floor to maintain balanced load conditions as far as possible) to a composite s.p.n. fuse board through two sets of 60 A switches and 60 A main fuses. Each of the three boards thus controlled on every floor provides eight, 15 amp and six 30 amp outgoing fuseways.

In considering the bedroom installation, it will be recalled that bedrooms are designed to serve the double purpose of both reception and sleeping, necessitating a greater attention to their facilities. Most bedrooms in the hotel, as will be seen from the plan of the first floor (Fig. 1) are, moreover, suites having a self-contained toilet and bathrooms and, in a few cases, also include a further large room specifically for living use. Electrical services to each suite have therefore to provide not only a supply for use in the bedroom but for lighting in the toilet, bathroom and entrance corridor.

Services in Suites

Normally rooms are arranged in pairs, usually one single and one double together, with an interconnecting door, as shown in Fig. 6. This arrangement assists considerably in the design of the mains supply to each room, enabling each pair to be supplied from one 30 amp ring main. The novel feature of this supply, however, is an inner switched ring, supplied from the main ring for main bedroom lighting. It is arranged as shown in Fig. 7, so that all outlets, apart from one adjacent to the bed, are supplied from this inner ring, which is controlled by a switch adjacent to the door. Although of 30 A rating, the switch is a micro-gap type and hence, being of small size, is readily accommodated in a 5 A box, and appears no different from the normal domestic lighting switch. Since the bedside outlet is permanently energised, the arrangement ensures that when the main lighting is switched off prior to retiring for the night, the bedside lamp remains on, and can be switched when the person is in bed. This outlet is incorporated in a multi-purpose, sectioned box supplying other services apart from lighting. The plan in Fig. 6 indicates the location of sockets in a typical pair of rooms, together with other services provided.

Apart from table or floor standing fittings, the only other lighting is that provided by a strip-lamp unit, which is flush fitted into the overhang above the dressing table. It is supplied through a suitably fused spur point and 5 A switch from the twin-gang socket-outlet on the dressing table. Mounted adjacently is a third outlet, for electric

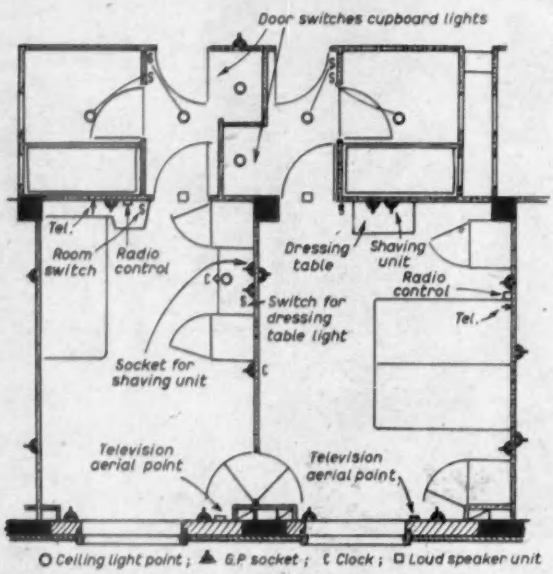


Fig. 6. General layout of a typical pair of bedroom suites, showing the siting of socket-outlets, fixed lighting points, and other electrical services

shavers. Lighting units vary from room to room, and are supplied by the four contractors—Hamptons, Waring and Gillow, Maples, and Gregory—responsible for furnishing rooms on the upper floors.

This impressive arrangement thus enables widely different requirements and tastes to be catered for. Considerable flexibility in the positioning of lighting units is permitted, whilst the other outlets enable radio or television receivers, and appliances to be supplied at will. It is unlikely that additional heating in the form of electric fires or convector units will be employed, however, since the hot-water heating system is designed to maintain a temperature of 67° F in all bedrooms.

To supply each ring main circuit, each end of the ring is connected in conventional 7/0·29 v.r.i. cables, to one

Fig. 3. This view of a single bedroom shows the multi-purpose outlet box, and adjacent radio control panel, the switch controlling socket-outlets and the loudspeaker. Fig. 4. This picture shows well the triple sectioned multi-outlet box and the wiring before screeding. Fig. 5. Here are seen the twin-gang outlet built into the dressing table, and above the mirror, the lighting fitting. A clock is to be mounted in the wall above the dressing table

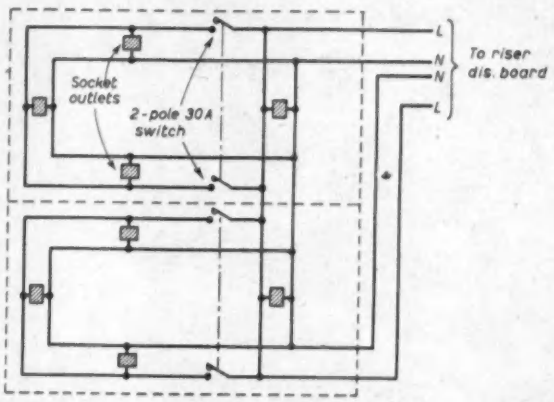


Fig. 7. Schematic arrangement of the ring main supply to each pair of suites, in which all but one socket-outlet is connected to the inner switched ring

of the 30 A fuseways in the dis-board at the nearest rising main. From the board, cables are conveyed in conduit to the centre section of triple-partitioned cable trunking laid in the corridor. From this trunking a conduit tee-off carries the cable into the suite concerned.

The trunking, which runs the whole length of the corridor on each floor, as shown in the plan view, Fig. 1, is laid on the concrete sub-floor, and the final screeding made up so that the covers are flush with the floor surface. Since carpeting, the full width of the corridor, is to be laid direct on the screed, access to the trunking at any time is not difficult.

For the six or so ceiling lighting fittings in the bathrooms, toilet, and entrance passages to each pair of suites, the cable is run from the dis-board up to the floor above and carried in the trunking there to the appropriate position. The conduit tee-off then drops through the ceiling switch points and fittings. Provision for each drop was made during the casting of the flooring, and the conduit installed later. In the same way are supplied the Troughton and Young ceiling fittings for the corridor lighting and for several store rooms and cupboards. To complete the general electrical arrangements common to each floor are 13 A socket-outlets, numbering about a dozen, installed at intervals along the corridor to provide a supply for cleaning appliances.

At this stage it is also appropriate to consider the other electrical services provided for each room. These comprise radio relay loudspeakers, television outlets, electric clock, telephone, and service call system. For the radio system, provided by Rediffusion Ltd., receiver and distribution amplifier equipment housed on the roof provides an audio-frequency output which is relayed to loudspeakers, mounted, in each case, above the entrance door of each bedroom. Similarly for television reception, an aerial outlet is situated in each room, fed by an amplifier on the roof taking its input from a main aerial. Supply cables for both systems are run in vertical ducts situated at intervals along the central corridor. The control unit for the loudspeaker is flush mounted adjacent to the multi-purpose, bedside outlet box.

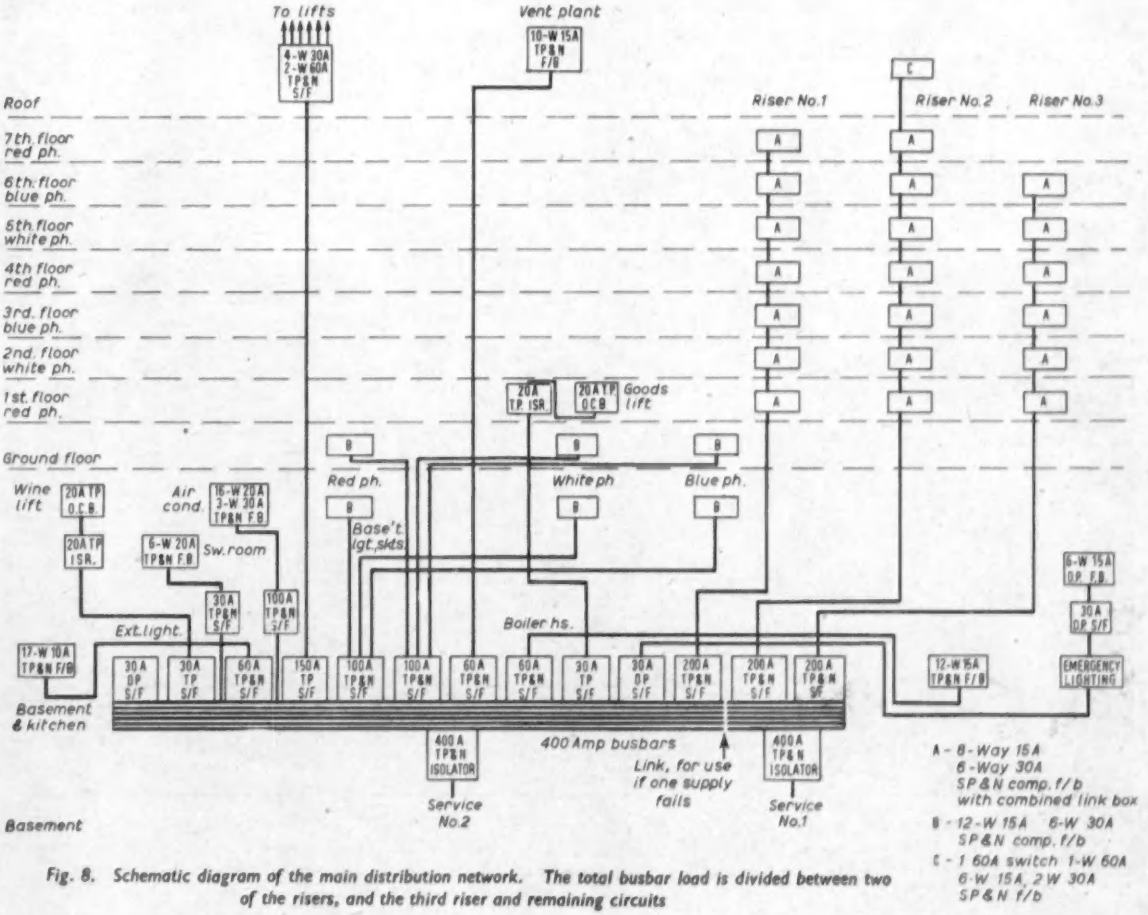


Fig. 8. Schematic diagram of the main distribution network. The total busbar load is divided between two of the risers, and the third riser and remaining circuits

It is to this box that the room telephone is connected, the telephone wiring being taken back, through separate conduit, to its own partitioned channel in the corridor trunking. All telephone wiring connects to a dis-board on the main telephone rising cables, situated in the duct associated with the west, or No. 3, staircase.

Call Service System

The remaining service associated with the multi-purpose box is the service call, and staff location, system. Although completely wired ready for use, the system is not planned to be put in use immediately and consequently the outlets in each room are, at present, blanked-off. Service will be dealt with over the internal telephone system. The arrangement provides for a push-button, fitted in the multi-purpose box, which is connected to a reset panel flush-mounted in the wall of the entrance corridor to each suite. Pressing this button operates a self-holding relay in the reset panel, which operates a buzzer and panel light in the service room situated off the service lift. At the same time, an indicator lamp fitted above the entrance door to the suite is energised, together with a direction indicator lamp mounted in the corridor wall opposite the door of the service room. This lamp indicates to the staff the direction (either right or left) of the room from which the demand for service originated. After a given interval the buzzer is automatically cut off, although all lamps remain lighted until the system is reset at the panel in the room concerned.

The reset panel, moreover, houses a key switch, which energises the corridor indicator lamp and panel light in the service room. It can only be operated with keys carried by the staff, who, when working in any of the rooms, would turn on the switch. A glance at the indicator panel in the service room is then sufficient to inform floor supervisors of the exact location of all staff. Wiring of the service call system has been carried out entirely in 3/·036, v.r.i. cable using a third partition in the corridor trunking, together with floor conduit runs from the trunking to each room.

For the electric clock circuit, a master clock is installed in the reception office which also houses the control for the fire alarm system. From the master clock are served the slave clocks, one to each room, using the vertical ducts in which the radio and television services are run. For the fire alarm system, three push-buttons and four fire bells are installed on each floor. Its main supply is taken from one of the two batteries installed in the intake room, and feeds the master control board in the reception office, from which risers feed the relays associated with the push buttons.

Ground Floor Installation

Turning now to the ground floor arrangements, it will be recalled that since bedrooms are also designed for use as living rooms, correspondingly less provision is required for lounges, and similar rooms where residents may spend leisure time. For this reason, only two rooms are set apart as such, of which one combines this use with that of cocktail bar. This is set at the eastern end of the building, on the Conduit Street side of a central gallery. This gallery, which is the main feature of the ground floor, extends from the No. 1 stairway at the eastern end of the building up to the two passenger lifts, the hotel entrance leading into it at approximately half way along. To the left of the entrance, between it and the cocktail lounge, is a small semi-partitioned space forming a lobby. To the right a similar space extends to partitioning forming a book shop, news stand and ticket bureau. On the other side of the corridor are located, on the left from the eastern end of the building, the tea room and restaurant; facing the entrance, telephone booths; and, to the right, cashier and reception desks and manager's office. Occupying the remaining space behind these rooms, from the restaurant to the building line shown dotted in Fig. 1, are the kitchens with the bakery adjacent on a mezzanine floor. In the main, the remaining ground floor area, which fronts on to Conduit Street and Bond Street, is given over to space available for letting.

Decoration and lighting in the residents' rooms on the ground floor provide a contrasting variety, ranging from contemporary style in the cocktail bar to a neo-classic treatment for the restaurant. The central gallery itself is lit entirely by wall mounted, half-bowl fittings, arranged

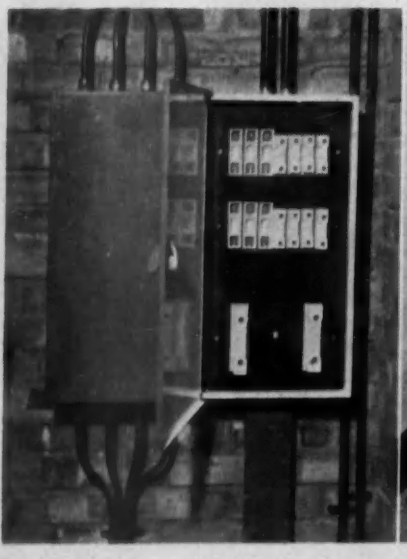


Fig. 9. Composite switch and fuse-board on rising mains for supplying part of a floor installation. Fig. 10. Trunking in the corridor is readily accessible since it will be covered only by carpeting. The runs of GPO, mains, and call service wiring are clearly seen. Fig. 11. (inset) The attractive Troughton and Young fitting used for corridor lighting. Fig. 12. Varilectric's main switchboard and the runs of "Pyrotenax" cable

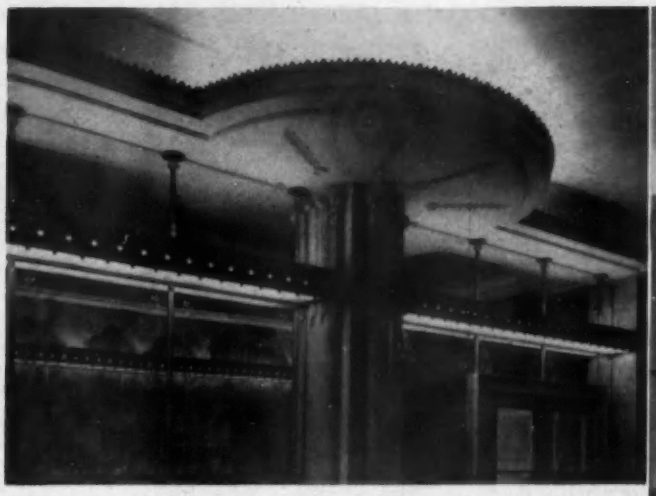


Fig. 13. Stylish and graceful, this picture of the mirror wall in the tea bar shows both rows of architectural strip lighting

Fig. 14. (right) Decorative combination of cold cathode and tungsten filament lighting in the cocktail lounge

at about 7 ft above floor level. For the semi-portioned spaces, however, chandelier type units, having frosted glass diffusing panels supported in radial upward curving arms, provide illumination. Both fittings were supplied by H. H. Martyn and Co. Local lighting over the reception desk, and in similar places, is afforded by recessed tungsten lamp fittings, fitted with a central diffusing glass disc.

In the restaurant, eight chandeliers provide the main lighting each fitting housing eight 60 W filament lamps. Supplementary lighting, however, takes the form of decorative bracket fittings fitted into apses set in the central row of three columns, and in the walls. In contrast, architectural strip lighting is employed for the adjacent tea bar. Arranged in a continuous length down each longer side of the room, they provide lighting vertically upwards and downwards with decorative holes at intervals along its length to give a "star" effect. In both rooms, White Allan supplied fittings.

Cocktail Bar Lighting

For the cocktail bar and lounge, lighting is by concealed cold cathode lighting, located, in the lounge behind a central circular cornice, and the bar off the lounge, round the edge of the ceiling. It is supplemented by wall mounted, twin filament lamp brackets and by filament lamp fittings recessed into a small canopy extending from the central column, and also over the bar. Here Hamptons were responsible for lighting, furnishing and decoration.

In the kitchen and associated rooms, Benjamin "Glas-steel" filament lamp fittings are employed, whilst the installation also includes a small number of socket-outlets providing a supply for food mixers and similar appliances, the only electrical equipment used. For ground floor offices, Holophane's "Lumilux" prismatic glass units form the main lighting provision, whilst this firm's "Ripplelite" units are used for corridor lighting, the basement and other private parts of the hotel.

All wiring is taken from three s.p.n. composite dis-boards, having 12 15 A fuseways and six 30 A fuseways. Conduit is used throughout, the runs for ceiling fittings being taken up to the first floor, buried in the screed, with drops through the ceiling at the appropriate places. All three dis-boards derive their supply through two, single-core, 0·03 sq in. m.i.c.s. cable from a 100 A t.p.n. switch-fuse, each board connected to a different phase. A similar arrangement obtains for the basement lighting and socket-outlets supply for which surface wiring, conduit enclosed, is employed.

Apart from the foregoing provisions, a considerable part of the installation supplies other services, comprising, in the main, heating and hot water plant, air conditioning equipment for the ground floor rooms, and plenum and extract ventilation for bathrooms and toilets, refrigerating plant and the hotel's six lifts. Air conditioning is employed for the restaurant, tea room, cocktail lounge and reception offices, the associated plant being located in the basement and supplied from the main board via a 100 A, t.p.n. switch-fuse, a 0·0225 sq in. four-core m.i.c.s. cable, which terminates in a 16-way, 20 A, and three-way, 30 A composite dis-board. Designed and installed by Matthew Hall and Co., Ltd., the ventilating equipment comprises three 12-ton refrigeration compressors, which using "Arcton 6" refrigerant incorporate shell and tube condensers and water chilling evaporators. Each compressor derives power from a 15 h.p. slip-ring motor, controlled by stator/rotor starters.

Plant for the plenum and extract ventilation system, designed and installed by Young, Austen and Young Ltd., is housed on the roof, supply being taken in a separate, four-core 0·0225 m.i.c.s. riser in the centre main duct from a 60 A t.p.n. switch-fuse on the main board direct to a ten-way, 15 A fuseboard in the plant room. The plant itself is designed to introduce plenum warmed air into the lobbies of all internal bathrooms and adjacent entrance corridors, and to extract air from bathrooms. For the plenum supply, duplicate No. 36 EK fan units are employed, each for a duty of 13,000 cu ft/min against 1 in. static water gauge. They are powered by 6 h.p. motors, and run at 410 r.p.m. Extraction is provided by duplicate No. 42 EK fans each capable of handling 18,000 cu ft/min against 0·8 in. static

water gauge and each driven by a 7 h.p. motor. Further duplicate No. 30 EK supply fans provide warmed air for the basement and ground floor offices. These units, rated at 8,000 cu/ft/min against 0·9 in. static w.g. at 460 r.p.m. are powered by 8 h.p. motors, whilst a 2 h.p. motor drives a third No. 30 EK fan for extracting air from the kitchens. In each duplicate arrangement, one set acts as standby.

Associated with the ventilating plant are the low pressure hot water heating, and domestic hot water supply systems, also requiring a considerable electrical supply. For these services, three c.i. sectional oil fired, boilers, erected in battery form and providing an aggregate rating of 7,376,000 B.Th.U.'s/hr, are installed in the basement at the rear of the building. Supply for the boiler room is afforded from a 60 A t.p.n. switch-fuse on the main board, feeding, via a four-core, 0·0225 sq in. m.i.c.s. cable, the 12-way 15 A board installed there. This supply serves, in the main, to provide power for a total of ten pumps, inserted in the water circuits for convectors and radiators, plenum heaters, and domestic hot water, together with a sump pump.

The other important service from the electrical aspect is that of the lifts, installed by Waygood-Otis Ltd. Of the six lifts provided, four serve the entire height of the building, comprising two passenger lifts, a luggage lift, and a service lift. Plant for these four is installed on the roof, the supply being afforded by a separate riser of a 0·03 sq in., three-core, and 0·0225 sq in. single-core, m.i.c.s. cables run in the centre main riser from a 150 A, t.p.n. switch-fuse on the main board. The supply cable terminates in a four 30 A way and two 60 A way fuse-board from which the isolator for each lift unit is fed, v.r.i. cable, run in surface conduit, being used for this purpose.

Supplied through 60 A t.p. isolators to their 40 A o.c.b.'s, the two passenger lifts are designed to carry twelve persons at 300 ft/min, and control of the 18 h.p. motor generator set is effected by a special variable voltage system—a modified Ward-Leonard arrangement. Features of the system include special arrangement of the generator motor fields, enabling acceleration to be controlled largely by their time constant and thus simplifying switching. Design provides for acceleration and deceleration of 4 ft/sec/sec to achieve maximum comfort and, together with automatic floor levelling which permits the lift to level to the floor whilst the doors are opening, to reduce flight time to a minimum.

The other two lifts supplied from the roof—for service and luggage—are powered by two speed 1,000/250 r.p.m., 13 h.p. a.c. machines. Control gear for them comprises 20 A o.c.b.'s supplied from the lift room dis-board through 30 amp isolators. The remaining lifts—wine and goods—operate between basement and ground, the wine lift opening into a wine store enclosed within the kitchen area. It is powered by a 1·5 h.p., 1,500 r.p.m., a.c. machine, mounted, together with its control gear above the lift shaft at ground floor level. and is supplied separately from the main board. Similarly, the goods lift, driven by a 4·5 h.p. 1,000 r.p.m. motor, receives a separate supply, which is run to the motor room on the mezzanine floor.

Thanks are due to the architect, Michael Rosenauer, F.R.I.B.A., and to the electrical contractors, Troughton and Young Ltd., for permission to publish and assistance in preparing this article.

Coventry's New Hotel

FOR Coventry's "Hotel Leofric," due for completion at the end of April, the electrical contractors were again Troughton and Young and it is not surprising that the installation bears a basic similarity to "The Westbury." From a Troughton and Young switchboard, two rising mains in "Pyrotenax" supply bedroom floors, terminating in suitable main distribution boards. From these boards, sub-main feeders are run to composite fuseboards controlling lighting and socket-outlets. The ring main system has been used for 13 A outlets in bedrooms, but this is arranged so that each outlet is permanently energised. For local lighting 2 A outlets are also employed, connected through a fused spur point from the ring. Both ceiling and bracket-type wall mounted lighting fittings are employed.

Situated in the city centre, "The Leofric" rises from basement to a 5th floor and apart from 108 bedrooms, a banqueting hall, restaurant, "Silver Grill," snack bar, cocktail bar, and several lounges serve residents and visitors. Interior decoration is "contemporary" in styling whilst considerable use has been made of modern building materials; "Frenger" ceilings being used in the main foyers. Lighting associated with this ceiling is particularly decorative, a "star" effect being obtained by employing motor car head light type lamps mounted in miniature reflectors, 24 V transformers being installed for supplying them.

A special lighting system has been employed for the ballroom, involving the main chandelier fittings, illumination of laylights from above, and cornice lighting from fluorescent lamps. Chandelier and laylight illumination is dimmer controlled, this equipment housed, together with switches and fuses for all the ballroom lighting circuits, on a single panel which also incorporates the loudspeaker amplifier for the ballroom public address system.

For exterior lighting, wiring is taken to a number of positions on the external elevations of the hotel for neon signs, whilst socket-outlets are provided on the facade for floodlighting supplies. The arcade and precinct lighting is again a combination of different types, using ornamental standards on the arcade roof, spot lighting fittings on its under side, with continuous trough fluorescent units lighting the general area. Shops on the ground floor are supplied by using a "grid system" of ceiling outlet points and sockets, establishing a preliminary installation capable of being adapted to individual user's requirements.

Claimed to be the first hotel built in Britain from British capital since the war, "The Leofric" was financed by Ravenseft Properties Ltd. and is to be operated by Ind, Coope and Allsopp Ltd.

"The Leofric" under construction

High Voltage Transmission in Sweden

Use of 650 kV a.c. or 400 kV d.c. under Consideration

SPEAKING at a Supply Section meeting at the Institution of Electrical Engineers last Wednesday, Mr Ake Rusck, President of the Swedish State Power Board, gave a résumé of the developments in high voltage power transmission in Sweden. He began his lecture by going back to the early days of electrical transmission in that country. In 1893, the first 3-phase line was operating —one of the earliest in the world. This line was only seven miles long but was for a voltage of 10 kV. By 1908, 55 kV had come into use, to be followed in 1921 by 132 kV and in 1936 by 220 kV. A plot of voltage against the time of introduction showed the remarkable fact that the various steps lay on a smooth curve.

Sweden had always been in the first line of high voltage transmission technique due to its natural conditions. The country was about 1,000 miles long from north to south and had a low population density of about 7 inhabitants per square mile, as compared with 80 in the United Kingdom. There was no coal, gas or oil within its boundaries, but there was ample water power, capable, according to modern estimates of producing about 80 x 10^9 units/year. At present, consumption was about 24 x 10^9 units, representing about 3,300 units/head of population. As some 85% of the population lived in the south of the country, and about the same proportion of hydro-power was in the north the problem of power transmission was formidable, involving the transfer of large quantities of power over distances of 300 to 1,000 miles.

The supply industry of Sweden was not nationalised. The State Power Board was responsible for about 40% of generation and the remainder was in the hands of numerous private smaller enterprises. The power board however owned an extensive system of 220 and 380 kV lines, and operated those 220 kV lines which were privately owned. For transmission purposes Sweden could thus be regarded as a single unit.

Transmission System

In 1946, four parallel 220 kV lines connected the north of the country to the south. Load growth however was so rapid that it was estimated that one further 220 kV line would need to be erected each year. It was therefore vital that a higher voltage should be selected, and greater point was given to this by the need for establishing stations ever farther northwards.

Studies were carried out, and in the autumn of 1946 it was decided to go ahead with a 380 kV a.c. system, with a maximum nominal voltage of 400 kV. At the same time the question of using high-voltage d.c. was considered, but in view of the lack of positive information at the time, this system was temporarily shelved.

Before the 380 kV system could be erected, the load had grown to such dimensions that it was decided to increase the load carrying capacity of the long 220 kV lines by the introduction of series capacitators. This proved so successful that they were also included in a line designed for ultimate operation at 380 kV.

Owing to the possibility of high-voltage surges, it was expected that peak voltages for the 380 kV system would be 1,550 kV for the lines, rising to 1,775 kV near the lightning arrestors. It was also decided to insulate transformers and switchgear to withstand levels of 1,775 kV. Experience had shown that these figures were on the high side and a figure of 1,500 kV was now more generally used.

To minimise the corona losses double conductors, spaced 18 in. apart were used. The towers were of steel, and spans of 1,100 ft were used. Harspranget was opened in 1950 and was the most northerly of the generating stations. By 1954 the loading had become so great that once again series capacitors were included, this time at 380 kV. The corona losses on the long 380 kV lines were about 2% in 300 miles and the radio interference levels had proved remarkably low. Faults averaged about 25/hundred miles of line/year, and many of these were cleared by automatic reclosers on the system.

High-Voltage D.C.

Although d.c. had been temporarily held in abeyance on the mainland distributive system, research work continued on the design of rectifiers and mutators. As this equipment improved in performance the thoughts of the power board turned toward providing a supply for the Island of Gotland some 60 miles from the mainland. The voltage was to be 100 kV to earth with a seawater return, the total loading being about 20 MW. (A description of this system was given in our issue of 3rd June 1954.)

Since the system was put into initial operation, two cable faults, both due to mechanical causes, had occurred. The initial loading had, however, been limited to 10 MW, but confidence was now expressed that 20 MW would be shortly attained with overloads up to 25 MW. Most of the time power had been transmitted from the mainland to Gotland, but the system could easily be reversed and the steam stations on Gotland had, at times of water shortage, provided power for the mainland. The converters had behaved very well and no commution failures had occurred. During the last year, some short-circuit tests were carried out on the a.c. side of the mutators and it was found that they continued to operate throughout the short-circuit period. "I think," said Mr. Rusck, "we may consider that the problems of high voltage d.c. transmission have been solved."

The cost of the Gotland scheme worked out at about £1·3m, of which £350,000 was spent on the cable. This represented about £65/kW of transmission capacity. Owing to the increasing Gotland load it was probable that the system would be doubled in the near future, in view of the valuable experience which had now been gained. Studies had been made on the present cost of transmission by d.c. and a 100 MW, 200 kV link between the mainland and Gotland would cost about £21/kW. The Swedish board had also studied the proposed cross-channel link, and for 100 MW, 200 kV it should work out at about £18/kW.

Future Prospects

Had the board possessed the knowledge they now had, when the 380 kV system was considered, it was probable that 450 kV would have been adopted, and if internal over-voltages could have been eliminated the system would

have been 500 kV. A new system was under consideration for the future using 650 kV. This would have four bundled conductors, and the line could handle 2,000 MW with series condensers. Four of these lines should cope with all future power transfers.

There was also the possibility of using e.h.v., d.c., and it was thought that prospects were favourable for ± 400 kV d.c. Such a system would have two sets of conductors, one running at 400 kV above earth potential and the other at 400 kV below. The capacity of such lines would be about the same as that of the 660 kV 3-phase a.c. lines, but would require a much smaller tower structure. The main expense would, of course, lie in the conversion plant.

The lecture concluded with a short film showing the building and installation of the equipment for the Sweden-Gotland link. This began by detailing the circumstances which had led up to the requirement of a link with the mainland. Gotland itself, was, like the mainland, without natural fuel resources, and had to import fuel. There was however a thriving industrial development, principally centered around cement manufacture and a steam station with a capacity of about 16 MW existed on the island. The load increase, together with the price of imported fuel made it most desirable that, if possible, a link with the mainland should be established. The 63 mile gap between Gotland and the mainland made it virtually impossible to use a.c. due to the fundamental cable characteristics. As A.S.E.A. in co-operation with the State Power Board had already been carrying out extensive work on the design of grid controlled mutators, and tests had shown that a suitable rectifier/invertor valve could be built, it was decided, with the backing of the Swedish Government to proceed with a h.v., d.c. system. The film showed the manufacture and laying of the cables, the development of the valves and the installation and operation of the system.

Power Export from Yugoslavia

IN 1953, Yugoslavia had harnessed for power purposes only 3% of her 60,000 x 10^6 kWh/year hydro-electric potential. This led the Committee on Electric Power of the United Nations Economic Commission for Europe to recommend that the possibilities of building hydro plant for power export should be investigated. An inter-Government group "Yougelexport" was set up to carry out a detailed study, Austria, Italy, the Western Zone of Germany and Yugoslavia being the countries concerned. Their report has been encouraging enough for a report, "Prospects of Exporting Electric Power from Yugoslavia," to be published by the Industry Division of the Economic Commission for Europe.

TABLE 1. IMPORTS OF YUGOSLAV POWER BY AUSTRIA, GERMANY AND ITALY.

Year	Summer (1 April to 30 Sept.)		Winter		Total	
	kWh x 10^6	MW	kWh x 10^6	MW	kWh x 10^6	MW
1956	100	100	300	100	400	100
1957	190	300	1,200	400	1,390	400
1960 min	190	300	1,200	400	1,390	400
max	270	500	2,400	800	2,670	800
1970	640		3,660		4,300	1,400

Table 1 shows the estimated potential imports of Yugoslav power. In connection with the export scheme, major transmission works will be necessary, involving an extensive system of 380 kV lines extending to Austria, Germany and Italy.

Technical Details

The first project recommended involves a station at Perucica on the River Zeta. Four reservoirs are to be constructed, and there is a gross head of 1,800 ft. A start has already been made on one dam. The main power station is to be equipped with six sets each consisting of twin Pelton wheels driving a 40 MVA horizontal generator. Average production is expected to be 1,148 x 10^6 kWh, of which 769 x 10^6 kWh will be available during the winter. In a dry year this will fall to 972 and 546 x 10^6 kWh respectively.

Next in the list is the catchment area of the Cetina River, which forms the central part of the Dinaric Alps. In the first stage of the development, which alone is considered in the report, two main installations are contemplated: a seasonable storage reservoir at Peruca, near the top of the system, and a hydro-electric station not far from Split, discharging into the Adriatic. This station is provided with a day to day and weekly regulating reservoir a quarter of a mile away.

A power station is to be provided at the foot of the main storage area, which will have two 20 MW sets working under a head of 187 ft. At the main Split station the gross head will be 945 ft and four sets of 178,000 h.p. each will give a total capacity of 490 MW. In an average year production will be 160 x 10^6 kWh at Peruca and 2,090 x 10^6 kWh at Split, with 61% of the output available during the winter.

Third comes the development of the Lika and Gacka, two neighbouring rivers whose catchment area forms the northern part of the Dinaric Alps. Both these rivers disappear into swallow holes before reaching the sea. One major reservoir, one day-to-day regulating reservoir and much tunnelling are planned, together with two power stations. The main station is an underground structure, 920 ft below the surface, driven in from sea level. The maximum gross head will be 1,460 ft and there will be four sets of 91,500 h.p. each, giving a generating capacity of 242 MW. Annual production in an average year will be 920 x 10^6 kWh of which 690 x 10^6 kWh will be available in the winter.

The Idrijca project is a somewhat smaller scheme, which again features a deep underground power station some 676 ft below the surface. There is one main 372 ft high dam, and a gross head of 589 ft is used to drive the three 46,900 h.p. turbines which provide a total capacity of 112 MW. Production in an average year is 340 x 10^6 kWh, with 210 x 10^6 kWh in winter.

Finally comes the Trebisnjica project, in the South of the country. This is one of the largest schemes, and there are various possible methods of development. As set out in the report, the scheme would have a power station at the foot of the main reservoir, and another where the water will discharge to the Adriatic near Dubrovnik. The former station will have a gross head of 375 ft and an output of 240 MW, given by three sets. The Dubrovnik station will be underground and use a gross head of 976 ft to give an output of 600 MW from six sets. Total generation in an average year will be 2,300 x 10^6 kWh, of which 85% will be available in the winter.

The report gives, besides the information summarised here, much civil engineering detail and cost estimates.

Engineering as a Profession

NEED TO MAINTAIN STANDARDS OF CORPORATE MEMBERSHIP STRESSED AT I.E.E. ANNUAL DINNER

ELECTRICAL engineering as a profession provided the theme for the principal speeches at last Thursday's annual dinner of the Institution of Electrical Engineers. A company of over 1,400, including Ministers of the Crown and heads of nationalised industries assembled for this occasion at Grosvenor House, London.

Principal guest was Sir Raymond Evershed, Master of the Rolls, who gave as the background to the importance of the professional approach to engineering, a grim picture of mankind retreating from the implacable offensive of science. Some wondered if technicians had too great an advantage over the rest of mankind. The I.E.E., he suggested, provided consolation for such frightened hearts, for its members would never forget that they were members of a profession. All professional men throughout their lives were conscious not only of the tremendous debt they owed to their profession, but also of the obligation that rested upon them. In all a man did, relating to his profession, he had in mind that no standard could be too high.

However great the capacity required to absorb the necessary requirements of electrical engineering, electrical engineers should, in Sir Raymond's view, keep before them the fact that this branch of applied science was only part of the total sum of human knowledge. It was necessary to keep it in its proper relation to the whole. In this respect he recommended as a text a saying attributed to John Hopkinson: What is wanted is not to depend on mathematics alone, but to have a general appreciation of whether a thing looks about right.

More Engineers Required

Sir Raymond had spoken to the toast "The Institution of Electrical Engineers," and the response to this came from Mr J. Eccles, the president. Electrical engineers, he said, were men of laws as well. It was the business of scientists to discover nature's laws and of technologists to apply them. It had been said that technology was what science was called when it became useful. Engineers faced the limitation that their laws were subject to examination, verification and crosscheck. They tried to improve on nature and to achieve things to which nature could not aspire. They had their darker side, the Marley's ghost of explosives, atom bombs and poison gas, but there science was in the hands of necessitous non-scientists, anxious to take a short cut home. There was more to the credit side of science, though.

Mr Eccles recalled the statement in the recent White Paper on nuclear power. "Our future as an industrial country depends on the ability of our scientists to discover the secrets of nature and on our speed in applying the new techniques that science places within our grasp." It was surprising how many people did not believe that, and thought that some magic hangover from our past financial power would enable us to retain our share of world trade. They could not get into their heads the fact that price, quality and delivery were the things that mattered in the world bristling with scientific knowledge. This country could not afford not to have the best.

The outlook for the middle future was not too bright. Primary and secondary schools were the nursery of science, and at the moment there was a dearth of science teachers. Also, in some schools there was a leaning towards the humanities—as though science was not the greatest humanity of all. What was needed was, that every boy with an aptitude for mathematics and mechanics should be exposed to science so that later he could judge where his true future lay.

The necessary supply of young engineers would only be ensured by deciding to provide good enough money and prospects for teachers in schools and colleges, so that they were attracted there as much as to industry; by the Ministry of Education giving a sound structure to technological education; and by parents encouraging their children to adopt a scientific career.

Mr Eccles continued with the statement that the three major engineering institutions thought it extremely important that students should receive comprehensive courses in mathematics, physics and chemistry as well as engineering technology, in colleges were properly equipped and adequately staffed.

The content of courses was of much greater importance than the award they led to. The institutions were doing all they could to point the way to maintaining standards. They believed it would be disastrous to the country to lower the required standard for entry to membership. Professional standards were very special; and it was not possible to agree to any proposal that would produce a crop of sub-standard men calling themselves engineers but unable to aspire to becoming members of a professional engineering institution.

Mr H. Bishop, as past-president of the I.E.E., proposed the toast of the Guests, and in the course of his remarks spoke of the members of the Institution as being closely allied to the trade associations; together they had to break down the popular reactions of fear and misunderstanding which were constantly arising in relation to engineering and science. He went on to underline the ever-closer working between the major institutions; something that did not happen 15 years ago. He thought that this was a very good thing.

Bank Rate and B.E.A.

Lord Citrine responded to this toast, although as was pointed out, he was present as well in his own right as a Companion of the Institution. Referring to the rise in the Bank Rate which had been the day's principal news item, he said that in substance the B.E.A. would have to pay between £1½m and £2m to the bankers "for doing the same work." Was this, he asked, tied to more productivity? But he paid tribute to the Chancellor of the Exchequer for taking the stand he had. Those who read the Trade Returns had misgivings. Although Governments had found out how to maintain full employment, and this had become part of the British people's way of life, Governments did not control all the factors that bore on such problems.

At the base of national prosperity was that of the electrical industry, and he was gratified by the tribute to its importance paid in the recent White Paper. He hoped, however, that it would never be necessary again to devote considerable energy to convincing slightly sceptical Treasury officials of its importance.

READERS' VIEWS

Correspondents writing under a pseudonym are asked to submit their names in confidence to the Editor

D.C. Field Connections

I WAS pleased to note that my article "Checking D.C. Field Connections" prompted Mr C. W. E. Marshall to pass comment, and I thank him for his observations. I feel that his remarks are misleading as he has misinterpreted the last paragraph. My statement that a d.c. generator can be *treated as a motor* is correct when carrying out operations a, b, c, d, e and f but the compound winding must indicate opposite polarity relative to the shunt winding under those circumstances.

The matter can be best cleared up by considering a compound interpole d.c. motor which is to be used as a generator. The procedure is to reverse the compound winding and maintain the same direction of rotation, or reverse the shunt winding and the direction of rotation.

The interpoles require no attention.

S. X.

* * *

AN easy way to remember the correct polarity of interpoles in a d.c. generator is to think of the letter G in Generator and G in lag. The polarity of the interpole which lags behind the main pole in the direction of rotation is always the same as the main pole. The opposite applies in the case of a motor when the interpole leads the main pole of same polarity in the direction of rotation.

C. S. Buyers, M.I.E.E.,
GLASGOW.

Physiology and Heat

I TRUST you will let me make some more comments on the above subject. I am prepared to accept Mr Ackery's absolute statement that the object of space heating is to control the loss of heat from the body. Where I was in error was in ascribing to the sensation of "warmth" a inward heat transfer. This is thermo-dynamically wrong in the majority of cases—certainly below 98° F. Nevertheless, the injunctions I have had from Mr Bates—your issue of 16th December—"to consider the warmth received from the sun amid the snows and low air temperature of Switzerland and appreciate the folly of (my) remarks," and from Mr Ackery—your issue of 6th January—"to reflect that nature's way of providing comfort by very high temperature radiation at a moderate air temperature," do not, I regret, seem to bear much significance. The problem is concerned with, generally, a clothed individual endeavouring to obtain the maximum comfort, with minimum expense, and confined within four walls. Sun temperatures of 3,500° K are not readily available from normal heating appliances. Reflection factors as high as those obtained in snow and ice are also not common. We seem only to be left with moderate radiant temperatures—converted to local lower temperatures by clothing—plus moderate air temperatures; and I am still convinced that the latter is the more important.

"Thermo-electric."

Portable Tools

THE fault that I described in my letter published on 3rd February actually happened and the person concerned might have lost his life. Mr Palmer, in his letter commenting on it (ELECTRICAL TIMES, 24th February), stated that the severed earth could have at the same time "shorted" with the phase; it could have happened that the other side of the broken earth could have shorted with the phase, and the fuse would have blown.

I think it is necessary to take into consideration what has happened, and to take precautions. In the fault I described, the phase core was not damaged at all, and I think that if there had been an inspection by a competent engineer beforehand, before the leakage actually happened on the machine itself, the operator would not have come to grief.

I have found, and I think there must be many places the same, that there is a lot of risk with owners of small works, etc., not understanding the risk and danger they run with these portable tools, and as far as expense is concerned, a good many owners would be willing to safeguard their employees, if the right advice was given to them.

How many handymen couple the three pin plugs up in these places, and never bother with the earth. I have seen it happen and this is where something should be done. People's lives come before expense.

G. A. Leighton,
MORPETH, NORTHUMBERLAND.

Extensions to Southall Technical College

OCCUPYING a leading position in the educational establishments in South Middlesex is the Southall Technical College, which on Friday celebrated the official opening of its third extension since the college was built in 1928. Opened by Sir Claude Gibb, C.B.E., F.R.S., D.SC., M.E., M.I.MECH.E., the extension makes an important contribution to the educational facilities serving the wide range of industry in the West Metropolitan area.

The new extension, of a "stepped" three storey and two storey construction, is wholly given over to electrical and mechanical engineering, housing a comprehensive range of machines and equipment for students studying the Ordinary and Higher National Certificates and more advanced work. Its two electrical engineering laboratories are well equipped, the advanced laboratory having synchronous induction and commutator type a.c. motors, synchronous and motor converters, mercury arc rectifiers, transformers and the like. Supply to all benches is taken from a main switchboard at one end of the room, cables being run in ducts buried in the screed, with flush outlets provided at intervals. All protection is effected by m.c.b.'s.

Of particular interest is the applied thermodynamics laboratory, where the plant installed includes a 75 h.p., 8,000 r.p.m. Parsons steam turbine. A single cylinder three-stage machine, its output power is dissipated in a Heenan and Froude water brake, driven at 3,000 trough gearing. Steam is supplied at 100 lb/sq in. by a Cochran oil fired boiler, rated at 2,250 lb/hr, and is also used to power a 20 h.p. compound steam engine. Use is made of the Venturi principle and orifices have been designed to measure gas, steam and water flow.

Three oil engines are installed, 100 h.p., 6 cylinder, A.E.C.; 40 h.p. Lister; and 23 h.p. Robey machines whilst other plant includes a 12 h.p. high compression gas engine and two, four cylinder petrol engines. Engine test plant, supplied by Heenan and Froude, is also of advanced type, and includes two electric dynamometers incorporating control gear regulating the amplitude of the current regenerated.

around the trade

by Peregrin

RECENTLY I ventured my views on the deplorable lack of uniformity in trade publications, but I did not indulge in any wishful thinking. It is pleasing therefore to learn that a revision of B.S.1311, which aims at this very reform, was published in the same month as my comments appeared. As one has become accustomed to expect, this B.S. is extremely comprehensive and carefully drafted by those who know something of the subject, but how long it will take to overcome the conflicting interests involved is a matter for gloomy conjecture.

There are two standard page sizes laid down, to cover all kinds of publications. The larger is about the size of the ELECTRICAL TIMES, and the smaller about half that size. Taking a quick but not very hopeful check I found that a considerable number of existing catalogues conform to the larger size, but not many to the smaller. I was not surprised to find that the most attractive, the most easily identified, in fact the most useful catalogues, are of various odd sizes, differing from the B.S. requirements as much as they differ from one another. The firms concerned will have to make a considerable sacrifice if they come into line. But every reform has to have a beginning, and B.S. 1311 is a good one, even if we do not feel its benefit for many years.

I also commented recently on the problem of the National Service of apprentices, and I see that Mr R. A. Marryat has been good enough to state his views on the subject. Now, anything Mr Marryat has to say about juvenile labour must be treated with respect. His firm has long been noted for its enlightened and generous treatment of promising youths. Indeed his father, the late Howard Marryat, used to boast that all the best London electricians started with him, and he was probably not unduly overstating.

Nevertheless, I still am not convinced, and neither are those employers with whom I have discussed the problem. As a sideline to the main issue, surely Mr Marryat's contention that service in one of the technical branches of the Services may be regarded as a sort of continuation of apprenticeship training, is a fallacy, and I am surprised he believes it. I have not yet met a returned service man who does. Apart from that, when an apprentice starts his service, he can either be plucked from a promising apprenticeship and have to mark time for two years, or he may go as a newly qualified operative, having completed his training with honour and distinction. *In either case*, being only human, the youth will probably return feeling unsettled and disillusioned, without much inclination to resume where he left off. Which then is the better choice in the interest of the youth? I still think that it is wise for the apprentice, the parents and the employer, to face facts, to agree on registration for National Service at the minimum age, even though, as I said before, this arrangement means a distinct sacrifice on the part of the employer.

Now that the Post Office has decided to discontinue the radio interference suppressor service it has carried out so tirelessly for many years, a profitable sideline should find its way to those electrical retailers who will apply themselves to it. No great degree of technical knowledge is required, for the dealer usually does not have to discover the interference himself. The disgruntled owner of the radio or television receiver does that for him. It only remains then to seek the likely cause, and, on the principle that every appliance is guilty until it is proved innocent it is as well to fit a suppressor to everything that might be able to transmit an unwanted signal. The cost is quite small, there is no expensive or unsightly wiring to install and the manufacturers have produced some very neat suppressing devices, the most simple being actually embodied in a plug top ready to attach to the end of the flex. Some wholesalers, up to the minute as usual, already have display and demonstration facilities for the small type of suppressor, so the retailer need not go short of expert advice.

Gradually, of course, all interfering domestic appliances, and much industrial equipment, will have suppressors built in during manufacture, and that is all to the good but it need not deter the enterprising retailer. There will still be many thousands of cleaners, refrigerators, hair dryers and other offenders to be brought into line, so there will be a constant demand for many years.

As always there is a snag in this attractive prospect, for of course the man who has to pay for the suppression is not the one who will benefit by it, and he may resent interference with his own equipment more than the other kind of interference, but official regulations may alter that before long.

Hire Purchase

A brief survey during the past week failed to find any evidence that the electrical trade has been rocked to its foundations by the Hire Purchase bombshell, which the daily press predicted for weeks and then exploded gleefully. Independent retailers in particular are inclined to wonder what all the fuss is about. Most of them were already demanding 10% deposit at least, and more if they could get it, while 18 months was considered reasonable and 24 months plenty long enough for completion of payment.

In some quarters there is a feeling of disappointment that the restrictions of 1952 were not re-imposed. They certainly helped to put hire purchase on a sound and sensible basis, and they also brought everybody into line, including the electricity boards. It is generally agreed, even by the large stores, that hire purchase was getting out of hand, and that something would have to be done about it. These moderate restrictions are a help in that direction, and they may, of course, affect the sale of some goods, such as furniture, but they will hardly cause a flutter in the electrical trade.

Some retailers view the restrictions in a more gloomy light, as a warning not to expect much in the way of purchase tax relief next month. Well, we shall soon know, and meanwhile neither a slight curb on hire purchase nor a disappointment about purchase tax is likely to disturb unduly the present prosperity our trade is enjoying.

Gracious Living on View

IDEAL HOME EXHIBITION COUPLES REGENCY ELEGANCE WITH CONTEMPORARY LABOUR SAVING IDEAS

THE theme of this year's Ideal Home Exhibition, organised by the *Daily Mail*, and opened at Olympia, London, 1st to 26th March, is the gracious living and elegance of the Regency period. In the Grand Hall a most realistic Regency façade houses exhibits of priceless treasures formerly the property of four celebrated Regency figures—Beau Brummell; the great Duke of Wellington, Richard Brinsley Sheridan and Mrs Fitzherbert, morganatic wife of the Regent George IV.

Regency living, however graceful, does not compare with life in New Elizabethan times, especially if it is based on the "Four Foundations of modern living" and that willing servant Electricity.

Always one of London's most popular shows the Ideal Home Exhibition, nearly 50 years old, has become a unique international domestic market place and it is small wonder that so many manufacturers save their new introductions for the opening of the show. In the limited space of these pages it is intended to present an account of the displays and products under the heading of each section of the exhibition.

Household Services Section

Recently added to their range of appliances by the English Electric Co., Ltd., is their new **Tumbler Dryer,** which, operated from a normal power outlet, dries 9 lb (dry weight) clothing by the use of a 2,750 W heater and a drum revolving at 48 r.p.m. Available in cream or white the E.E. Tumbler Dryer costs £50 plus £19. 10s. purchase tax. Other equipment shown both here and on the gallery stand 250 include the E.E. washing machine with or without rotary ironer, the popular 2011D automatic cooker and the standard 3-plate cooker incorporating the new glass oven doors. Two refrigerators in white and mazarine or cream and turquoise along with the food mixer and plate warmer are shown.

Automatic cooker control panel is a new feature shown by the General Electric Co. This is fitted to new G.E.C. cookers which are available at £49. 12s. 6d. complete, making auto cooking available at a price far below that of present ruling prices. This new unit can be fitted to existing DC114 cookers by fixing in place of the existing hotplate. The panel can be bought separately for £12.

The **new non-scratch electric warming plate** on display was featured recently in the ELECTRICAL TIMES (17th February, 1955), whilst new at this year's exhibition is the **DE81 refrigerator,** an 8 cu ft model embodying up-to-date refinements. More shelf area and "front row" space has been provided in the 3 cu ft model whilst the 5 cu ft unit has two plastic racks inside the door.

An entirely **new upright cleaner,** finished in maroon and grey and selling at £21. 10s. 3d., is complementary to the new floor polisher with automatic switching. For the laundry the Company have introduced a new cabinet washboiler small enough to tuck away but having an 8 lb capacity. It sells at £15 complete. Other equipment includes "Cosyglo" fires and contemporary lighting along with the normal range of proved G.E.C. products (Stand No. 36).

Embodying **push-button defrosting** and the **Polarsphere** the 1955 range of refrigerators by Nash Kelvinator has been restyled, the cream finish now available goes with gilt-finished trays (Stand 37).

The **Turbo polisher** is the latest attachment to the Electrolux cleaner, model 55. This well-styled appliance uses the suction air current to rotate a polisher brush, felt and lambswool pads. It is finished in a modern silver blue finish and costs £8. 17s. 5d. New to the exhibition is the L230 refrigerator which was mentioned in our 9th December, 1954, issue. Electrolux have two stands No. 40 and 163.

Featured by Prestcold is the range of domestic **refrigerators, Models L72, L52 and the S313** in alternative finishes, which were featured in our 23rd December, 1954, issue. The latter is mounted on a revolving turntable displaying its many points of advantage (Stand 39).

Next door is the Belling Stand (No. 40) where the **"Streamline" cooker with automatic heat control,** illuminated oven, inner glass door and wheeled base takes pride of place. The Wee Baby and Big Baby Belling cookers are there with a good selection of the other Belling appliances, including heaters, drying cabinets, etc. The "Streamline" model 64AB cooker is particularly unusual in its fold down splash plate/hob cover.

Frigidaire on Stand 42 present their 1955 range of **household refrigerators in six gay colours.** All the models (five in number) are powered by the exclusive "Meter Miser" compressor.

"Perspex" model of a heater is featured at the front of the Dimplex stand to show the internal construction of their range of oil-filled electric heaters which are available in free standing and wall mounting patterns (Stand 43), whilst across on L. G. Hawkins stand (No. 44) are many of their recently introduced electric fires. The Marylin was described in our 3rd February, 1955, issue. Hawkins, of course, are responsible for the **Electric Hostess** which has for some years made an eloquent addition to gracious living.

Fires styled both period and modern are a feature of Berry's Electric display (Stand 45). This firm caters for all tastes in the Magicoal range of fires, the Raydair background heater, immersion heaters and the new-look water heater, together with the period and new range of contemporary lighting fittings which are further examples of the wealth of design in the Berry products.

The C90 **cooker with "Speedheat oven"** is, of course, principal exhibit by British National Electrics. This oven heats in half the normal time with no extra consumption. Fires and water heaters complete the range of the company who once again are staging for the duration of the exhibition a competition on the appliances with four cookers as prizes.

E.D.A.'s stand—always notable in design—this year embodies a novel centrepiece. **A six-foot "magic hat"** moves up and down in the air to reveal each of the four foundations of modern living; first comes a cooker, then a refrigerator, then a washing machine, with finally a water heater. Four new appliances appear on this stand. First is a **push-button temperature control for boiling plates**—the "Autostat" by Arcolectric Ltd., which relies on the heat of the saucepan contents for control. It affords four static temperatures working on a time and temperature basis. An **electric laundry maid** is featured. This is by

H. Fisher and, although a prototype, gives housewives an augury of future washday ease. It embodies a heated washing machine with power wringer and rotary ironer, a collapsible ironing board, a compartment for housing a steam iron and a soap container. Tricity Cookers **"Coronet" cooker,** also shown, is designed for small flatlets and sells at 33 guineas. Also novel are the Panel Heaters **shock-proof towel rail** (see ELECTRICAL TIMES, 18th November, 1954) and a new **prototype water heater** the Creda "Crusader."

On the other side of the Grand Hall is the display of Falcon Forge **wrought-iron lighting fittings** by Thomas Haywood and Sons Ltd.

Building Sundries Section

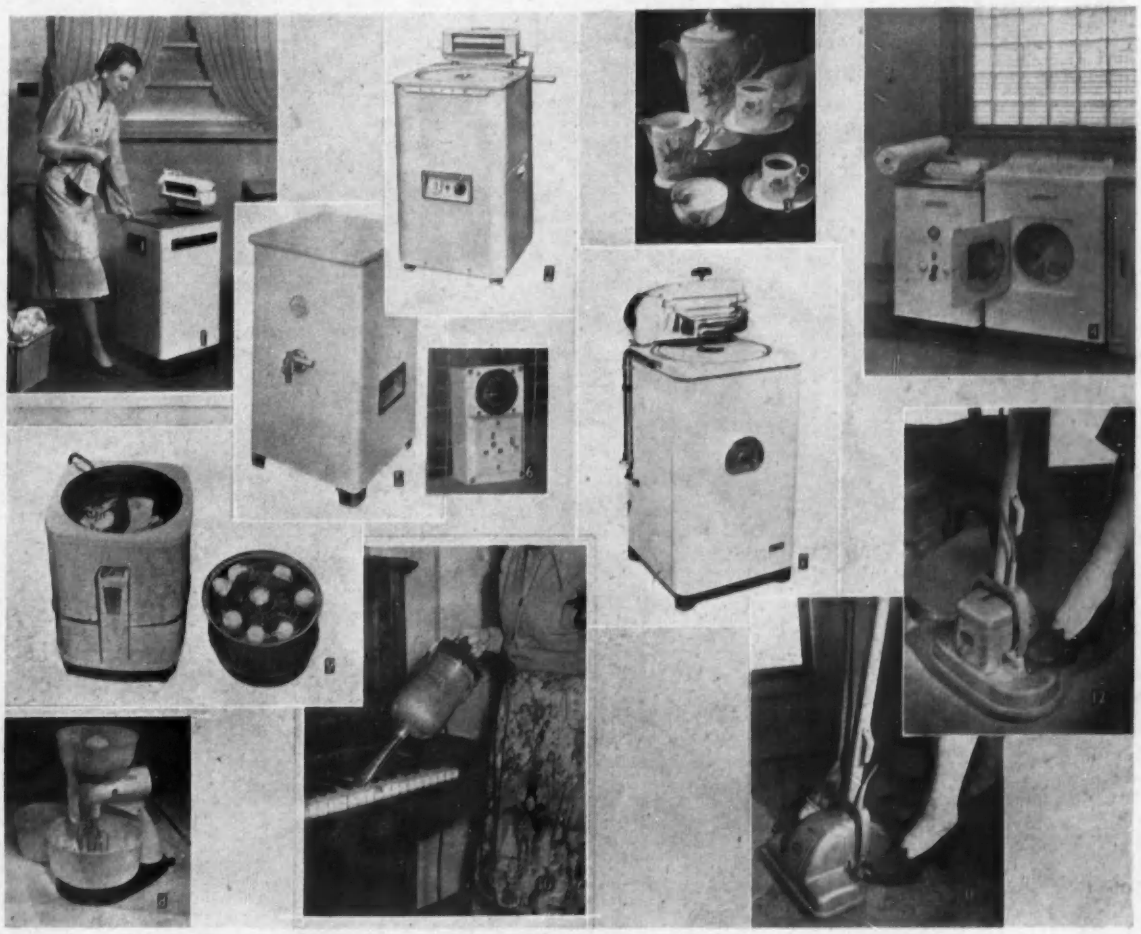
Amongst the displays of building sundries the **three complete kitchens** shown by Eeze Kitchens (Stand 127) incorporated built-in cookers, refrigerators and sink units in a manner which most housewives will envy. Further round on Stand 137 S. N. Bridges have made a feature of their **"Complete Home Workshop"** with the Toolpower range of products. Westland Engineers Ltd., makers of "Welrise" garage doors, have in operation on their stand No. 162 an **electrically-operated garage** door which employs a key-operated switch to put in motion the solenoid catch and electric motor. This equipment costs £34. 18s. (not including gate).

Sunbeam Electric Ltd. are in the Fashion and Beauty section (Stand 168) where they are demonstrating their "Shavemaster" electric razor, and on the first floor of the Empire Hall (Stand 302) where the **"Mixmaster"** is being put through its paces (see ELECTRICAL TIMES, 10th February, 1955).

Philips Electrical also have a stand (No. 175) in the former section where the **"BI-AX" dry shaver** is being demonstrated, but have in addition many of their products in "Knowle House," sponsored by a famous magazine. These include radio and TV receivers, the "Infraphil" infra-red lamp, "Photoflux" flash-bulbs and Philips fluorescent lighting. Further dry shaver in this fashion and beauty section is the new model by Ronson Products Ltd.

Domestic Labour Saving

The Domestic Labour Saving Section is, as may be expected, the site of very many electric appliance displays. Starting in the gallery of the Grand Hall the visitor will find Stand 217 where Vactric show their range of cleaners



1. Hoover's latest Mk III washing machine has a 10 in. power-operated wringer. 2. This Model 122 washing machine by Burco Ltd. is available in two colour schemes. 3. Latest Elga introduction is a companion china service to their "Auto perc" coffee brewer. 4. Two indispensable laundry units by English Electric are the heated washing machine and the new Tumbler Dryer. 5. G.E.C. have just introduced this stylish washboiler. 6. One exhibit on E.D.A.s' stand is this Metalform cooker timer unit. 7. Parnall washing machine. 8. The Mixmaster is latest domestic appliance by Sunbeam Electric. 9. Thor's "Automagic" handles both clothes and dishes. 10. The Jifextra handy cleaner has now a more powerful motor. 11 and 12. Two companion appliances introduced by G.E.C. the upright cleaner and the floor polisher are both finished in maroon and grey

and polishers. New is the **modified Hand-suction Cleaner** with extensions and attachments to save stooping. This sells at £10. 17s. 11d. against £9. 14s. 2d. formerly. The R53 upright cleaner now incorporates a floor brush strip which can be replaced for a few shillings.

Newest product shown by Kenwood Electrics (Stand 218). is the **"Roto-Blend"** machine which liquidises, grinds and blends in a fraction of the normal time.

Thor Appliances who were recently absorbed by Parnall (Yate) Ltd. have a stand alongside their parent company (Stands 221 and 222). On the stands are the famous Thor Spin Dry washer, the Model 544 with power wringer and the Model 65 Coronet washer together with the all-electric Parnall **safety washer.** The Parnall "Ezy-Press" ironer completes the display.

The British Vacuum Cleaner and Engineering Co., Ltd. (Stands 225, 243 and 301) feature **three new vacuum cleaners** and a restyled Teasmade. On the first stand they have demonstrations of their washing machine; on the second are the three new cylinder models.

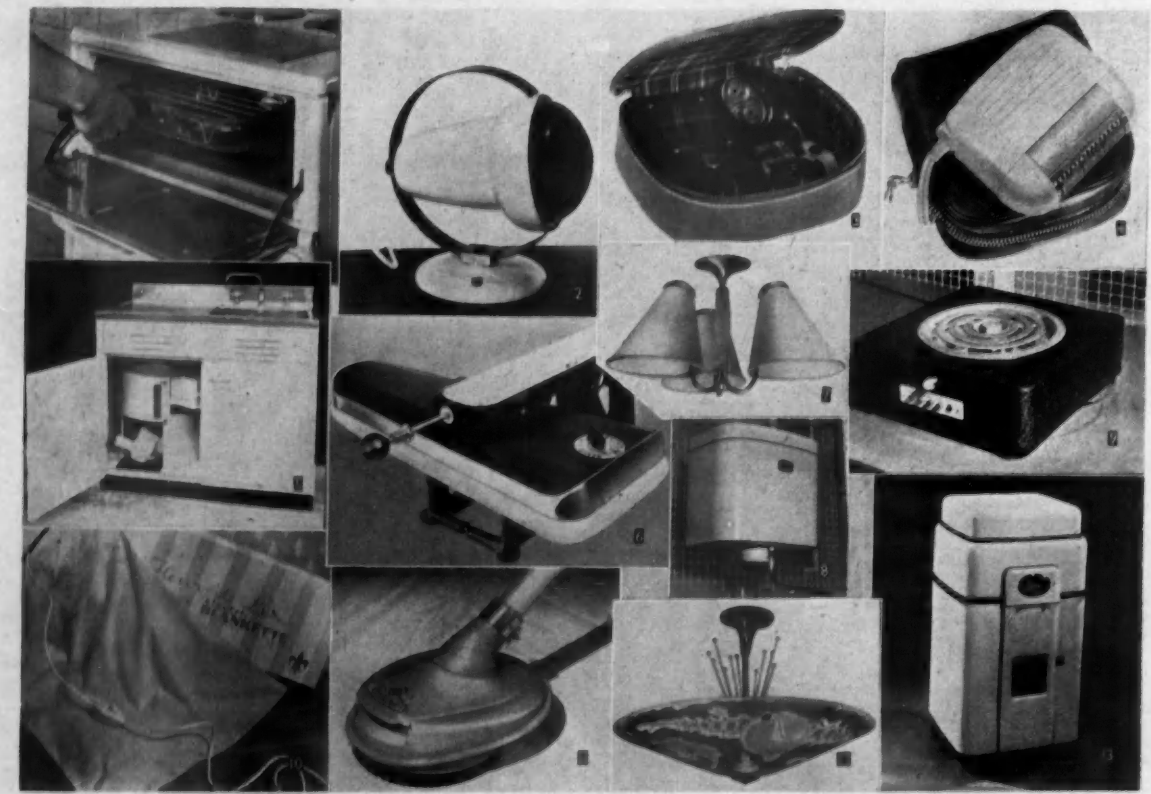
Hoover on Stands 227 and 245 have their brand new **Mark III washer with power wringer.** This is similar in design to the Mk. II but has a 10 in. wringer easily lifted and placed in position. The Mk. III has a specially-designed 1/5 h.p. induction type 300 W motor which drives the machine pump and wringer. It sells at £42. 14s. 6d. plus £16. 0s. 6d. purchase tax. They also have displays of their steam iron whilst on Stand 234 they display the complete range of Hoover cleaners and polishers.

Fraikad Ltd. on Stand 231 make a feature of their "Romix" and "Rotel" range of appliances. The Romix ice cream maker fits into a refrigerator; the Mixer combines the function of shredder, juicer, blender and emulsifier whilst the Rotel steam iron attachment converts an ordinary iron to steam iron use. All are precision Swiss products.

Fillery's (G.B.) Ltd. on Stand 232 have two appliances. One is **a polisher with suction (SP3)** whilst the other merely acts as an electric polisher (P3). Model SP3 has a vacuum bag with throw-away container. Both are finished in maroon and grey whilst both of these can be converted to scrubbers by easy replacement of rotary brushes. Other appliances include the VP1 vacuum cleaner/floor-polisher/wet-scrubber which shook the appliance market when introduced some time ago. The Fillery 254 silent running cleaner literally climbs the stairs.

The Flexaway flex carrier is again demonstrated on Stand 239 by J. and P. Bruce Ltd. It is an attachment which keeps the cord out of the way on an ironing table and has been blessed by many housewives.

New model displayed by Dishmaster (London) Ltd. (Stand 244) is the **Commercial dish-washing machine** which has a 4 kW heater in the 3-gallon booster tank. A 2 kW drying element is fitted at the base of the bowl which takes a new-type crockery basket. The lid of this machine is interlocking to comply with Factory Acts Regulations. The



1. The B.N.E. C.90 latest super cooker includes a Pyrex heat-proof glass casserole grill pan. 2 and 3. Two Philips Products are the "Infraphil" infra-red lamp and the "Bi-Ax" dry shaver. 4. Sunbeam Electric are demonstrating this "Shavemaster" on their stand. 5. Eeze Kitchens sink unit with a washing machine. 6. The "Ezy-Press" flat bed ironer by Parnall (Yate) Ltd. Berry's fitting 8 and 9. Two more new appliances on the E.D.A. stand are this prototype Creda "Crusader" water heater and the Arcolectric "Autostat" push button control for boiling rings. 10. Thomas French entered the appliance field with their "Fleur de Lys" electric blanket. 11. Latest introduction by Electrolux is this Turbo Polisher attachment for the Model "S5" vacuum cleaner. 12. One of Berry's Electrics contemporary lighting fittings. 13. The Servis Model "S" washing machine is in great demand

1. Belling's have featured this combined convector heater radiant fire model 750. 2. New G.E.C. cookers embody this auto control panel which slips in to the splash plate fixing. 3. Fillery's new SP3 floor polisher with suction arrangement. 4. New model 9·7 net cu ft refrigerator by Frigidaire is part of the 1955 range. 5. Ending drudgery for many lucky people is this "Adamaid" dish-washing machine. 6. Electrolux recently introduced this L230 table top refrigerator. 7. The 2011D automatic cooker by English Electric is in the vanguard of the new auto-timed electric cookers now reaching the market. 8. Jackson Electric Stove have just introduced their "Cookalone" timer which is incorporated in the 194 cooker seen in illustration 9. 10. The Arcason dish-washer is available both as a cabinet model and for building into existing kitchen fittings

Commercial model sells at £94. 10s.—£2. 17s. 9d. less than the domestic model.

A table model 2·5 cu ft refrigerator selling at £49. 10s. including tax is the principal feature of Stand 247, the Alaska Manufacturing Co. It is an all-metal stove-enamelled unit with silent absorption-type cooling gear, automatic interior lighting, ice cube trays and three conveniently spaced storage trays are included.

Demonstrations of the Servis model "S" and larger models are a feature of Stand 249. Here Wilkins and Mitchell Ltd. have the whole range of their appliances which includes two refrigerator models and a rotary ironer. This model "S" which is a heated washing machine with power wringer yet sells at only £49. 19s. 9d. has been very popular amongst housewives. The "Deluxe" and "Superheat" models are larger all-electric luxury models with 9 lb capacity.

Easiclene Porcelain Enamel (1938) Ltd. (Stand 252) have their EW1 model washing machine featured, whilst Burco Ltd. on Stand 257 have the **striking new Model 122 washer** which is an all-electric heated model available in white and red and eau-de-nil and cream at £36 plus £12. 5s. 8d. Occupying only 21 in. by 19 in. floor space this model washes 5½ lb of clothes in 6 gallons of water. Other models displayed include the 375 and the 10P.

Jackson Electric Stove Co. on Stand 263 have now introduced their **"Cookalone" oven timer control.** It can be fitted to the 190 and 290 series of cookers and costs £11. 5s. or £12. 5s. It embodies a timer and a 4-hour "Cookalarm" bell pinger. This timer unit is at present available for mounting with tubular supports. **Model 295 the new cooker in the 290 series** has two 8 in. solid boiling plates, one fitted with "Simmerstat." It is available in three finishes. All switches on the 194 and 192 models have polished metal inserts and bezels. The new improved "Clearview" glass door has a full-size outer heat retaining door which is now easily removable. One cooker on the stand has red legs and comment is invited from the public.

The Jifextra cleaner shown next door on Stand 264 by Water Softener and Vacuum Cleaner Service has a new motor unit with double-stage fan. It results in less noise and 15-20% increased suction.

Paladin Mixers by Barclay and Sons (Stand 270) and the Noel de Mille (Stand 271) Merry Glo potato peeler have been noted before in these pages. Campbell Engineering's "Hotway" rapid water heater is shown on Stand 274 in sink and shower models, whilst on Stand 285 Tellus super vacuum cleaners are featuring what they claim is the only domestic cannister cleaner on the market.

The **"Mill-tric" coffee mill** by Hillman Electric Motors has been restyled and is now available in cream and green. It is shown on a joint stand (292) with Elga Products Auto Perc coffee brewers which are now available with a companion coffee service.

Bendix Home Appliances Model "D" automatic home washer is demonstrated on Stand 297. This is entirely automatic and made completely in Britain, whilst Ada (Halifax) Ltd. on Stand 306 have made a feature of their "Adamaid" auto dish-washer (see ELECTRICAL TIMES, 21st October, 1954) amongst other Ada domestic clothes washing machines Mks. I and II, and the "Coronation."

The "Do it yourself" section is an appropriate place for the displays of Black and Decker (402) and Wolf electric tools (410). These have been featured from time to time in these pages.

Wind Power for Somaliland

WIND-GENERATED electricity can play an effective part in raising the standard of living in British Somaliland. This conclusion is put forward in a report which has recently been published by the Electrical Research Association. It is based on a survey made last year by Messrs E. W. Golding (Head of the Rural Electrification and Wind Power Department, E.R.A.) and A. H. Stodhart, who visited the Somaliland Protectorate under the auspices of the U.N.E.S.C.O. Advisory Council for Arid Zone Research. The immediate object of the survey was to study indigenous resources in a typical semi-arid area.

Basic to the whole study is the assumption that for the advancement of a country industrially energy resources in the form of solid or liquid fuel or hydro power are essential; and that the same is true for agriculture, unless it is to remain merely peasant agriculture. Man, or animal, power has the disadvantage that it consumes a significant proportion of its own production of food.

Auxiliary Energy Sources

Where energy resources of the type discussed are not available, and where the transport element in the cost of importing them is unduly high, it is worth considering the use of local sources of energy which are less conventional and which have been little used in the past. These are, most commonly, the wind, solar energy, and waste vegetable matter. Certain snags are common to all three. They are not continuously available, and are often of random occurrence; and although they are free themselves, the machines for exploiting them are relatively costly; and prohibitively so if they are designed without a full knowledge of the working conditions. Further, storage to even-out the supply of energy is also somewhat expensive.

Much of the report on Somaliland is concerned with a description of the country, its people and their mode of life. The conclusion is reached, that if the existing nomadic way of life of the large majority of the people is to remain indefinitely, then the application of any form of energy will be severely limited. However, if development is the aim, then substantial help can be obtained from the auxiliary sources.

Water-pumping windmills of 5 to 15 kW, might play an important part in such development. They would usually be of the electrical generator type, so that windmill and pump could be located at the best positions for wind and water, respectively. The availability of electric power might make possible the mechanisation of other operations. Existing records show that usable wind speeds (12 m.p.h.) are fairly regularly available at certain times of the day, and arrangements have been made for the collection of further data on such matters.

Power from a light steam engine using waste material could provide a useful supplement for wind power, for a considerable amount of wood in the form of dead branches and twigs of acacia trees is available in some areas. Solar power, it is considered, can be used only for direct heating; it is reckoned to have little value for direct electrical generation as yet.

To sum up, the report envisages few large scale applications for the so-called auxiliary energy sources, but a start on development might be made with their aid. Obviously further study is needed, and there is interest in an ambitious scheme for a small community comprehensively powered by auxiliary sources, which the authors of the report propose.

ENGINEERING AT HARWELL

HEALTH precautions necessary amongst maintenance and services engineering staff at the Harwell nuclear energy establishment cause a loss of working time which averages 1·64 hours/man/day. This was stated in a lecture given to the Measurements Section of the Institution of Electrical Engineers recently by Mr W. E. Harris, under the title "A Services Engineer at Harwell."

A contributor to the subsequent discussion speaking from experience of the factories of the Atomic Energy Authority, as distinct from the laboratories, said that there the problem of precautions was much simplified, because the processes which would be carried out were known at the time of building, and were taken into account in the design. Moreover, experience had shown that the hazards to be guarded against were less severe than had been expected. This was also the opinion of a speaker from the laboratories, who considered that some of the safeguards there, and consequent loss of time, might be reduced as experience accumulated.

The practice at Harwell is for laboratories where research work is carried out on highly radioactive materials (Special Buildings) to have both maintenance and operation personnel under the control of one engineer.

Certain laboratory areas, together with extraction ventilation trunking and electrostatic precipitation chambers are classified as "probably-highly-contaminated" areas, and may be entered only by people dressed in pressurised suits. For handling some material, glove boxes are provided. These consist of transparent enclosures which retain airborne radiation particles, provided with elastic gloves of elbow length joined at their openings to apertures in the enclosure. Where possible, it is the practice to isolate the electrical installation in a separate compartment in glove boxes, in order to reduce fire risk.

The danger of fire in such apparatus comes mainly from overheated motors or arc faults igniting inflammable solvents. The protection of f.h.p. motors of 1/50 h.p. upwards is not simple when 100% saftey is required. Small thermal cut-outs, even when reasonably accurate in operation, need to be fitted into the motor windings to act quickly enough to be efficacious. The technique adopted has been to fill the electrical section of the glove boxes with nitrogen.

Disposal of radioactive materials and apparatus is a major task. When the scientists have no further use for highly contaminated equipment they give it to the engineer for disposal. One technique often adopted is to use p.v.c. sheets, joined by a high frequency welder, as an outer enclosure. Bags so formed are put into drums and the remaining space filled with concrete.

In the course of the discussion, two further points of electrical interest were taken up. The view was expressed by a speaker with A.E.A. factory experience that 50 V was preferable to 250 V for the operation of portable equipment, partly because it obviated the need for exacting inspections of earth continuity conductors. There was also the suggestion that simple and relatively inexpensive designs of sensing elements for instruments should be sought. Such elements frequently had to be exposed to radioactivity, and it was suggested that an expendable element of simpler form could be more readily decontaminated or if necessary, discarded.

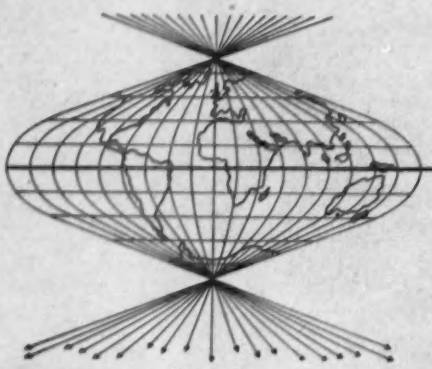
Lighting a Steelworks

MODERN INDUSTRIAL TECHNIQUES AT LACKENBY

SEVERAL interesting examples of industrial lighting applications are provided in the new open hearth steelplant of Messrs Dorman Long (Steel) Ltd., at Lackenby, and some of them are illustrated below. In the maintenance shops, shown immediately under, over 100 blended light fittings each housing a 400 W m.v. lamp and a 750 W filament lamp were supplied by B.T.H.

Each railway grid at Lackenby covers an area of 1,200 to 1,800 ft long by 300 to 500 ft wide, and as it was decided that no posts should be erected within the grid, illumination is provided by six 150 ft lighting towers, each capable of accommodating 40 1 kW floodlight fittings (made by B.T.H.). These floodlights incidentally were originally used for illuminating the site work. The lighting of a grid is illustrated at the bottom of this column.

On the right, top, is a view of the casting bay, with below it the charging bay. These are each illuminated by 50 G.E.C. circular high bay reflectors housing alternatively 1 kW Osram mercury vapour lamps and 1·5 kW tungsten lamps. The fittings are mounted in a single row at a height of 95 ft in the casting bay and 73 ft in the charging bay to give an average level of 6 lumens per sq ft with almost complete absence of shadow. The fittings are mounted on counterbalanced arms and pivoted to the side of catwalks in the roof to allow for easy cleaning and lamp replacement. Control gear, fuses and isolating switches, are mounted on the side of the catwalk. Design of the counterbalancing system was by the Dorman Long Engineers.



OVERSEAS NEWS

A SUMMARY OF IMPORTANT EVENTS

CANADA

New Scheme for Winnipeg

A new plan concerning the electricity distribution network arranged for Winnipeg, only recently announced by Mr D. L. Campbell, Premier of Manitoba, has been accepted by Winnipeg City Council. Under these proposals the Winnipeg City hydro undertaking would become the sole distribution agency within the city limits, and the Manitoba Power Commission would hold such authority for the remainder of the province. This would entail the exchange of certain network by the city hydro and the provincial government, and the former would pay nearly $7m as compensation for the difference in the value of the properties. Under the proposed agreement, the city hydro and the power commission would both purchase power from the Manitoba Hydro-Electric Board's McArthur Falls and Pine Falls plants at a price which would cover the board's costs. In addition the city hydro would continue to take power from its present stations at Pointe du Bois and Slave Falls, while the power commission would also take power from the Great Falls and Seven Sisters Falls plants of the board. It is also suggested that the fixed charges and operating costs of the city Hydro's Amy St steam power station and the Hydro-Electric Board's Brandon steam plant, now under construction, should be pooled so that either distribution authority could take a bulk supply at a stated unit price. Interconnection of the power transmission systems of the H.E. Board and the City Hydro is also suggested.

Wrangle over Water

The International Rivers Bill, introduced in the Canadian Parliament last month, is intended to give the Federal government authority to control works on rivers which rise in Canada and flow into the United States. It is the result of opposition of the proposal of British Columbia under an arrangement with the Kaiser concern which provides for the construction of a dam on the Lower Arrow Lakes in B.C., from which water would be fed to another dam at Bonneville, Washington, for the generation of power. The new legislation is aimed to block that arrangement and make it obligatory for authorities concerned to obtain a federal licence before a dam or other improvement on an international river could be constructed. The debate in the House of Commons has been heated at times.

The St Lawrence Turbines

The sixteen 75,000 h.p. water turbines for the St Lawrence power project, ordered by the Hydro-Electric Power Commission of Ontario from the John Inglis Co., the Canadian associates of the English Electric Co., Ltd., (which we briefly noted last week), will have a guaranteed efficiency of 92·5% when operating under a net head of 81 ft. The turbine runners will normally operate at 94·7 r.p.m., and are designed to give a run-away speed of 200 r.p.m.—thereby facilitating considerably the task of designing the associated generators (which are to be of Canadian manufacture). The turbine runners will be 21 ft in diameter, the shaft being 39 in. diameter. Spiral casings will be formed in concrete.

EUROPE

New Hungarian Station

The first generator has been put into commission at the Borsod power station, Berente, in North-Eastern Hungary. Five more steam turbine sets are to be added to bring the capacity of the station up to about 200 MW. The station will provide power to the many industries now being developed in the area.

Polish Station

The first of two sets of turbine at the hydro-electric power station now being built at Przewoz on the Vistula, near Nowa Huta, Poland, to which we referred on 10 Feb., has now gone into operation. This station is the first of a group of hydro-electric stations which are to be built on the upper reaches of the Vistula in the next few years. The turbines and generators for the new station were built in Austria, we understand, but the remainder of the equipment is of Polish manufacture.

Plant Delay

The blame for delays in the construction of Russia's large Kuibyshev hydro-electric power station, on the River Volga, and the associated 400 kV transmission line has been laid at the doors of the Ministry of Electric Power Stations (now headed by Mr Malenkov), and the Ministry for Construction of Electric Power Stations (of which Mr F. G. Loginov is the head), according to a report in *Pravda*. Both ministries are criticised for refusing to see the advantages of using concrete instead of steel in vital sections of the power station, which is due to come into operation this year, and will have an ultimate capacity of 2,100 MW. There is delay in the supply of materials, apparently, for the power transmission line across the Volga.

RHODESIA

More Coal for Power?

The development of coalfields in the Sabi Valley, Southern Rhodesia, for the provision of electric power, is to be discussed at a meeting between representatives of Federal and Southern Rhodesian Governments and of the Anglo-Transvaal Consolidated Investment Corporation, we learn. For some years now, the electricity supply undertakings in the Colony, have had difficulties in regard to their fuel supplies. There are also reports from Northern Rhodesia of the discovery of thick seams of coal in the Kandabwe area of the Zambesi Valley. Further drilling is to be carried out.

INDIA

Sun or Wind Power

The successful harnessing of either sun or wind sources of energy for pumping irrigation water, domestic cooking, heating, lighting, or air cooling, and for small industries could transform the arid regions, it was said at a symposium held recently in Delhi under the joint auspices of Unesco and the National Institute of Sciences of India. Dr Faringdon Daniels, University of Wisconsin, said they should insist on a simple low-cost engine that did not need complicated repairs. A useful engine should cost no more than a horse, bullock or camel, and should have a work life at least as long as the animal's. The Indian Meteorological Department have installed 24 recording anemograph stations, and will add 15 more in order to have continuous records for estimating the total energy available from the wind, according to Dr P. Nilakantan, principal of Birla College,

Pilani, India. The selection of sites for high-capacity power generators requires reliable measurements at favourable points for more than a year. For small local power purposes authentic data cannot be obtained, but regions of sufficiently high wind velocities can be identified from meteorological surveys.

SINGAPORE

Remarkable Domestic Development

Reporting steady progress of the Singapore City Council's electricity undertaking during 1954, with an increase of 14·5% in units sold (a total of 318·4 millions), Mr C. C. Payne, city electrical engineer, tells us that it is estimated that there will be a deficit of approximately $1 million on the year's working. But this is less than anticipated due partly to the maturing of a War Damage claim of about $800,000. The year saw the commissioning of Nos. 3 and 4 boilers with No. 3 turbo-alternator and associated equipment at the Pasir Panjang power station, raising the generating capacity to 75 MW, despite delays caused by the London Dock strike. It is expected that No. 5 boiler and No. 4 machine should be operating this month. To bring Pasir Panjang station to its maximum designed capacity, Mr Payne states that it is imperative that No. 6 machine and Nos. 8 and 9 boiler, together with auxiliary plant, be ordered with the minimum of delay so that the undertaking can meet the peak loads expected to develop in 1959 and subsequent years. The Distribution Section carried out an extensive programme which included the laying of 62 miles of underground cables and 12 miles of o.h. line, and the commissioning of 44 new substations. The undertaking's appliance hiring scheme was again well supported, a further 3,897 electric cookers, 1,589 water heaters and 9,546 fans being hired during the year. But Mr Payne again emphasises the need for a comprehensive advertising and publicity campaign as being essential to the future development of the Department. He also wants an adequate showroom. Some 5,373 new consumers were connected during 1954, with an increased connected load of 49,817 kW. The undertaking's total connected load is 228,154 kW, and there are 100,248 meters in service—an increase of 11,038. A survey of Singapore Island has been completed, and 33 villages have been canvassed with a view to connection. Finally, Mr Payne records that throughout the open-vote workmen strike last July 100% continuity of supply was maintained. Without exception the senior staff, both expatriate and local, more than pulled their weight.

AUSTRALIA

View on Nuclear Power

The Atomic Energy Commission of Australia could not visualise the construction of nuclear power plants all over Australia, nor could it see nuclear power supplanting power from coal in New South Wales and Victoria, according to Mr Beale, the Federal Minister for Supply. He was speaking at the first meeting of the Commission, recently, when it was estimated that the £A.5½ millions reactor which was being built would probably cost £1 million a year to operate.

More Underground?

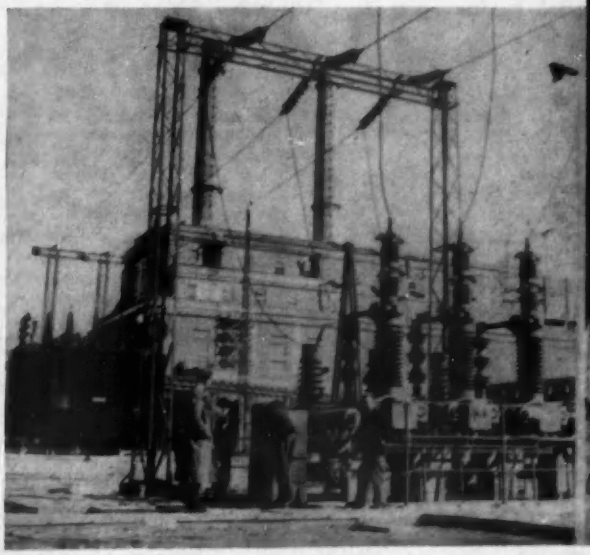
The Victorian Housing Commission and the State Electricity Commission of Victoria, are stated to be considering plans to use underground cable for service connections to new consumers. Apparently they are particularly interested in utilising a locally-made p.v.c. insulated cable for the work. The Housing Commission are considering using the method for connecting up the new blocks of flats in Toorak and Ashburton.

Work in W. Australia

Work on the new Bunbury power station of the State Electricity Commission of Western Australia is well up to schedule, according to Mr F. C. Edmondson, the general manager of the Commission. He has said that the concrete foundation for the station and its three turbo-alternators have been completed and steel constructions for the boilers were in hand. The route had been cleared for the associated 132 kV transmission line from Bunbury to Perth, and poles would be erected soon. Mr Edmondson was explaining the need for the State Electricity Commission's sixth loan for £1,260,000, of which £550,000 is earmarked for the Bunbury project and £260,000 for the nearly-completed South Fremantle power station, a further £100,000 was needed to pay for work in connection with the new alternator and coal-handling plant at East Perth power station.

POLAND'S LATEST POWER STATION

Further plant was put into operation a few weeks ago at the Jaworzno II power station, Cracow Voivodship, Poland, illustrated below. In the manufacture of the turbines, much assistance has been provided by Russian engineers, we understand. On the right is a view of the boiler control room



Personalities

IN THE INDUSTRY

Senior assistant engineer (transmission) to the South Eastern Division of the B.E.A. since 1948, **Mr E. P. Cardew** has been promoted to divisional transmission engineer. Prior to 1948 Mr Cardew was assistant transmission engineer for the S.E. and E. England area of the Central Electricity Board for six years, having earlier been C.E.B. section engineer at Canterbury since 1931. Previously he had gained experience with British Insulated Cables Ltd. Mr Cardew succeeds Mr C. F. Bolton who recently retired.

Mr John Allan has been elected president of the Falkirk and District Electrical Society, with **Mr Andrew Liddell** as vice-president.

Siemens Electric Lamps and Supplies Ltd. announce the appointment of several new assistant area managers. **Mr H. A. Page** has commenced duties as assistant area manager of the Birmingham branch, **Mr J. E. Walker** at the Belfast branch, **Mr F. Smith** at the Sheffield branch, and **Mr A. Chambers** at the London area office. The company's new branch office and depot at West Bay Road, New Docks, Southampton—which will be officially opened on 31 Mar. next—will be managed by **Mr A. Shaw,** who has been appointed sub-area manager. As from the 1 Mar., **Mr T. O. Wilkins** has taken up duties as assistant area manager at the Bristol branch. Mr Wilkins was formerly with Johnson and Phillips Ltd.

Mr E. Mills, A.M.I.E.E., has been appointed district engineer, Runcorn district of the Merseyside and North Wales Electricity Board. Since 1949 he has held a similar position in the Cheltenham district of the Midlands Electricity Board. Educated at Birmingham University, and North Staffordshire Technical College, he joined the former Callender's Cable Co., first as a mains record draughtsman at Stoke-on-Trent, and then became assistant engineer at the company's Birmingham contracts office. He entered the Supply Industry in 1940, being mains assistant with the Ealing Corporation undertaking until 1946 when he became deputy mains engineer at Cheltenham.

Assistant mechanical and electrical engineer, London Midland Region, British Railways, **Mr E. J. Larkin** has been appointed chairman of Derby No. 1 Hospital management committee.

Sir Arthur Fleming, C.B.E., M.SC.TECH., D.ENG., F.C.G.I., HON.M.I.E.E., M.I.MECH.E., director of research and education to Associated Electrical Industries, has retired from executive duties. He has, however, been retained in a consultative capacity. Sir Arthur has also relinquished his directorship of the Metropolitan-Vickers Electrical Co., Ltd. **Mr E. P. Grimsdick,** assistant to the managing director of Associated Electrical Industries, Ltd., has also retired from executive duties with the company, but has been retained in a consultative capacity on matters concerning India and Pakistan. He has also relinquished the directorships he holds in various A.E.I. subsidiaries.

Mr A. Upton, manager of the Switchgear Dept. of Johnson and Phillips Ltd., left last Friday by air for Karachi, Calcutta and Bombay. He is making a tour of inspection of J. and P. switchgear factories in India and Pakistan and will also have discussions with the managers of the sales offices at Bombay and Karachi.

Deputy managing director of Hoover Ltd., since 1953, **Mr S. Roberts,** F.I.S.M.A., has been appointed managing director of the company in place of **Mr J. A. Wykes** who has retired from the board on account of ill-health. Mr Roberts joined Hoover's as a salesman in 1929. He was quickly promoted to posts of increasing responsibility and in 1937 became a branch manager. After war service he returned to the company to organise and extend the system of training on the sales side, and in 1946 was made sales personnel manager. The following year he was appointed field sales manager. Mr Roberts is also a director of Hoover (Washing Machines) Ltd.

Mr J. E. Sherlock, chairman of Teddington Industrial Equipment Ltd., is now on a five weeks business tour of Australia and New Zealand.

Mr P. F. Barnett, D.F.H., GRAD.I.E.E., has been appointed technical representative for the London area to Davis Sheet Metal Engineering Co., Ltd.

The Minister of Fuel and Power has appointed **Mr Chris. Holden,** of Blackburn, as deputy chairman of the North-Western Electricity Consultative Council in succession to **Mr P. McNab Milin,** B.SC., A.M.I.MECH.E., A.M.I.E.E., who resigned on leaving the area.

Mr W. N. Herod, Ontario sales manager, Canada Wire and Cable Company Ltd., Toronto, has been elected president of the Electric Service League of Ontario.

Mr K. O. Rees, manager of the Electronic Tube Department of Mullard Overseas Ltd. is now on a business tour of the Near East and India. He is due to return to England this month.

Consequent on Mr F. J. E. Tearle's recent appointment to the A.E.I. Overseas Group, **Mr F. R. Mason,** B.SC.TECH., is now general manager, Metropolitan-Vickers Electrical Export Co., Ltd., and **Mr G. H. Jolley,** M.I.MECH.E., is principal representative of the Export Co. at Trafford Park in succession to Mr Mason. The latter joined Metropolitan-Vickers Electrical Co. in 1926 as a college apprentice. Subsequently he spent several years on power engineering work, and then a year with A.E.I. (India) Ltd., as technical representative. In 1938 he became engineer-in-charge of the paper-mill section of General Engineering Department, holding that position until 1948, except between 1942 and 1943—when he was seconded to the Ministry of Aircraft Production for work in connection with airborne electrical equipment; in 1943 he was attached to the British Air Commission in the U.S.A. In 1948 Mr Mason joined the Metropolitan-Vickers Electrical Export Co., Ltd., being appointed principal representative of that company at the Trafford Park Works, and in 1951 he was appointed to the Export Company's Board. Mr Jolley first went to M-V as a vacation apprentice in 1919.

Mr E. P. Cardew

Mr E. Mills

Mr S. Roberts

Mr J. N. Millar

Mr F. R. Mason

Mr G. H. Jolley

Mr N. F. Marsh

Mr J. Kenyon

After technical education at the Manchester College of Technology followed by a college apprenticeship at Trafford Park, he joined the company's Erection Department, first as a special trainee and later as erection engineer in which capacity his duties took him to Russia, South America, Egypt, Belgium, Roumania and South Africa; from 1934-39 he was in China and Japan as resident engineer. During 1940-45 Mr. Jolley was assistant works engineer at the Trafford Park Works. From 1946 he represented the M-V Export Co. in Malaya and the Far East. Returning to this country in 1951 he was appointed assistant chief engineer, Energy Application Engineering Department.

Mr Leslie Gamage and Hon. Mrs Leslie Gamage arriving in Sydney on their World tour

We are now able to reproduce above the photograph of **Mr J. N. Millar,** who as we briefly reported last week, has been appointed manager of the Industrial Atomic Energy Department, at the Fraser and Chalmers Engineering Works of the General Electric Co., Ltd. Mr Millar became a pupil at those works in between studies at Marlborough College and at Emanuel College, Cambridge (where he took mechanical science). Following naval service he returned to the Erith works and in Jan., 1947, went to the South African company as an assistant engineer. While there he took degrees in economics and industrial administration at the University of South Africa. He returned to the U.K. in July, 1951, and after a further period at the Erith works, went to Australia in Jan., 1952, as chief mechanical engineer to the Australian company.

The Minister of Fuel and Power has appointed **Mr N. F. Marsh,** M.A., M.I.E.E., as deputy chairman of the North Eastern Electricity Board, with effect from 1 Mar. Mr Marsh has been chief commercial officer of the East Midlands Electricity Board since vesting day. Educated at Oundle School, he was a graduate at Cambridge University, and in 1930 joined the Metropolitan-Vickers Electrical Co. as a graduate trainee, subsequently serving on their traction motor design staff in Sheffield. Appointed district engineer to the Mid-Lincolnshire Electric Supply Co., Ltd., in 1932, he became engineer and manager in 1938, and director of the associated companies Altrincham Electric Supply Ltd., and Public Utilities (Electric) Ltd. He was also supervising engineer of the Campbeltown and Mid-Argyll Electric Supply Co., and Thurso and District Electric Supply Co.

The Marconi International Marine Communication Co., Ltd., announces a change in the management of its depot at Aberdeen in view of the transfer of **Mr V. G. Oastler,** who has been in charge there since 1948, to the main London depot at East Ham. In his place **Mr A. P. Goodman** has been appointed as depot manager, Aberdeen, and takes up his new duties there immediately.

Mr A. F. Roger has been appointed a director of Automatic Telephone and Electric Co.

Senior assistant engineer (electrical) in No. 1 sub-division of the North West Merseyside and North Wales Division of the B.E.A., **Mr J. Kenyon,** A.M.I.E.E., has been appointed station superintendent at Blackpool. Mr Kenyon has served with the Electricity Supply Industry since 1918 when he joined the Nelson Electricity Department as an apprentice. After four years as a switchboard attendant, he went to Blackpool where he served for 20 years, for twelve of which he was shift charge engineer. He later obtained the appointment at Ribble.

Thomas Bolton and Sons Ltd. announce that **Mr R. J. Hall** has resigned from the Board. The directors have appointed **Sir Rex Hodges** to fill this vacancy, and in addition have made the further appointment of **Mr F. Waine.**

OBITUARY

Mr. B. H. S. Jennings, export manager to Standard Telephones and Cables Ltd., died on 10 Feb., aged 52. Earlier he had been assistant manager of the company's branch office in Calcutta. He was well known to most Posts and Telegraph Administrations throughout the Commonwealth, and to the High Commissioners or their executive staffs representing Commonwealth and Colonial countries in London.

Mr W. E. Evans, A.M.I.E.E., manager of the contract department, of the General Electric Co's. engineering works at Witton, died on 9 Feb., aged 67. Following an apprenticeship with Vickers Ltd., of Sheffield, he joined the Witton works of the G.E.C. in 1910, and after a year in the estimating department was appointed manager of the contract department, with responsibility for all important contracts for electrical plant and equipment, including the supervision of erection at home and overseas. Mr Evans occupied that position continuously for 44 years.

Mr C. P. Lockton, M.SC.TECH., M.I.E.E., chief engineer of Chloride Batteries Ltd., since Oct., 1949, died on 20 Feb. Educated at Berkhamsted School, and at the Manchester College of Technology where he studied electrical engineering under Prof Miles Walker, he obtained his M.SC. TECH. in 1923 and joined the British Electrical Plant Co., Ltd., to work on the design of small electric motors and dynamos. He joined the Chloride Electrical Storage Co. in Sept., 1924, as assistant to the chief engineer, and specialised on the technical problems of portable and semi-portable batteries, with particular reference to development work. During the war he was engaged in technical liaison with the Admiralty, War Office and Air Ministry on their many battery problems.

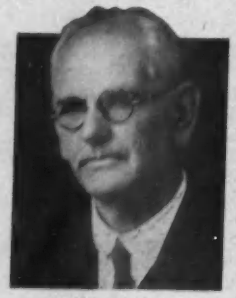
Mr C. P. Lockton

Mr R. Eccles, branch manager in Glasgow for British Insulated Callender's Cables Ltd., has died, aged 57.

joined the former British Insulated Cables Ltd. in 1928 and served in their Contracts Department until 1942 when he was transferred to the Sales Department at their Edinburgh branch. On the formation of British Insulated Callender's Cables Ltd. in 1945 he was appointed transmission engineer for Scotland and held this position until 1953 when he became branch manager of their Glasgow office.

Mr F. Quaife, manager, London Home Laundry and Vacuum Cleaner Department of the Hotpoint Electric Appliance Co., Ltd., since Jan. 1946, died on 24 Feb., aged 55. During the war he was with the Ministry of Supply on fighting vehicle production. He started with the Hotpoint Co. in 1931 as sales representative, and became manager, London vacuum cleaner sales, in June 1933.

Mr Donald Macadie, M.B.E., inventor of the "AvoMeter," and of coil winding machines, died on 13 Feb., aged 83. Born in Caithness in 1871, he came to London at an early age and joined the Edison - Bell Phonograph Co., later transferring to the National Telephone Co., with whom he worked as an engineer in Liverpool and Nottingham. When the National Telephone Co. was taken over by the Post Office, he was given an appointment at the Birmingham Post Office factory, and was later put in charge of the Post Office factory at Holloway, London. Throughout his career he exercised his great ability at invention and design, and numerous devices now in common use with the Post Office emanated from his brain. In 1932 the M.B.E. was conferred upon him and he retired from the Post Office the following year aged 62. In addition to evolving the "AvoMeter" instrument, he invented an automatic coil winding machine of great flexibility, developed a fully automatic paper inserting attachment for use with coil-winding machines, and later designed the first large multi-head coil-winding machine. After retiring from the Post Office he devoted a considerable part of his time to the Automatic Coil Winder and Electrical Equipment Co., Ltd., which he had helped to form in 1923 to manufacture two of his major inventions.



Mr Donald Macadie

Mr J. O. Cheetham, who died on 24 Feb., aged 86, was Lancashire Dynamo and Crypto's oldest pensioner. In his early days he was employed by Mather and Platt, but when Mr A. P. Wood, who had been with that company, founded the Lancashire Dynamo and Motor Co., the forerunner of L.D.C., Mr Cheetham joined him and was appointed the first company secretary. He retired in 1938.

BRITISH STANDARDS

Drums for covered winding wires and strips for electrical purposes for use in the U.K. *B.S. 2565:1955. Price 2s. net.* The present diversity in sizes and types of drum used for supplying electrical winding wires and strips leads to considerable inconvenience being experienced to both wire coverers and users. To overcome this difficulty the B.S.I., with the co-operation of the interests involved, has introduced this new standard dealing with such drums. Simplification of the present situation has been effected by specifying four different flange sizes for drums, each size having two traverse dimensions. Full details of dimensions, and essential requirements for materials, construction, reeling, wrapping, labelling and marking are specified, including a novel feature in the specification of a peg hole to take a breaking device, whilst a reference system for drum identification is also described.

D.C. motors for aircraft. *B.S. G.146, January, 1955. Price 3s. 6d. net.* Covered in this new aircraft are two types of d.c. motor of which type A is to be suitable for operating over a terminal voltage range of 25 to 29 V, d.c. on a nominal 28 V supply, or over a range of 100 to 116 V on a nominal 112 V supply. In both these cases, type A motors are also required to be capable of delivering their rated torque, although at reduced speed, at voltages down to 21 V on a 28 V supply and 84 V on a 112 V supply. Type B motors are required to be suitable for operating over a terminal voltage range of 18 to 29 V or 72 to 116 V on the appropriate supply. In general, motors complying with the Standard should be suitable for 1,000 flying hours unattended operation before requiring maintenance. Performance under specific types of duty is also specified, together with particular requirements covering rating, air cooling, brush gear and other aspects. Requirements for general, type, production and quality tests are given, together with appendices discussing methods of test.

Thermal storage electric water-heaters. *B.S. 843:1954. Price 4s.* Recently revised, this standard, which was originally published in 1939, has been widened in scope to include water-heaters having either copper or nickel-copper alloy containers. In addition, provision has been made for dual purpose heaters of the pressure type and of 18/20 gallons rated water capacity having two groups of heaters, one towards the top of the container and the other near the bottom; the two groups being independently controlled. The construction of non-pressure type water-heaters with concealed fixings is now covered.

The standard has been brought into line with the requirements of the Ministry of Health model by-laws, Series XXI, where these are applicable. Particular attention has been drawn to the necessity of providing pressure water-heaters with an open vent pipe, the diameter of which, in order to avoid excessive heat loss, should not be larger than is required for safety.

Exit Signs. *B.S. 2560:1954. Price 3s.* Experiments in one of the largest cinemas in Britain have shown that the lettering "Exit" incorporated in the illuminated box sign specified in this standard, is more legible than that currently used, despite the fact that the letter height is appreciably less. This standard lays down the general design and construction of these signs which may be either for recessing or surface mounting on walls in places of entertainment. Dimensions, diffusers and colour filters are standardised, and not the least important, the actual form of the letters. Illumination may be provided by electricity, gas or other forms of illuminant.

A.C. motors for aircraft: Part 1: Three-phase, 400 c/s squirrel-cage induction motors. *B.S. G.147, January, 1955. Price 3s. 6d. net.* Closely associated with its sister standard covering d.c. motors comes part one of the series covering the whole range of a.c. motors for aircraft. Specifying that motors shall be suitable for use on supplies with a frequency of 400 c/s ±5%, and a line voltage of either 200 V ±5% or 115 V ±5%, the standard covers the subject in much the same pattern as that in B.S. G.146. It is, however, not a requirement that a motor should be suitable on both supplies given above, but the machines may be used on a four wire system and the specified performance is to be obtained if the system is balanced within the above tolerance.

Cable sealing boxes for oil-immersed transformers. Part 1. Boxes for voltages up to and including 11 kV. *B.S. 2562: Part: 1955., Price 7s. 6d.* Although this standard was prepared primarily for lead sheathed cables, account has also been taken of those having aluminium sheaths. The type of cable box covered has the cores of the cables connected to terminals within the box. Boxes are classified according to voltage, current rating, number of poles and the number and size of cables and cable-glands. In addition, standard dimensions are given for a range of boxes which are suitable for both outdoor and indoor use and for components of the boxes, such as porcelains and cable-connectors. Although the standard does not purport to specify complete details of design and construction, some observations on this aspect have been included for guidance. It is intended to issue in due course a second part of the standard covering voltages in excess of 11 kV.

Copies of British Standard Specifications can be obtained from the British Standards Institution, 2 Park St, W.1, at the prices stated.

PROBLEMS AND PRACTICE

In Engineering

Every engineer has a story to tell; why not tell yours on this page? We welcome contributions to this feature, and those published will be paid for at our standard rates. Problems which are encountered and overcome in day-to-day maintenance or installation of electrical plant; useful methods and techniques developed for specific jobs, or current practices, all make instructive reading for others. We will also consider for publication problems requiring an answer. Sketches are often helpful and need only be rough, as they will be redrawn before use.

Moisture Ingress

DUE to intermittent tripping of the starter overloads a 3 h.p. motor had been removed from service and repeated checks had been made which verified that the loading of the motor was well within its rated capacity. The motor had been completely stripped down with a view to having the stator rewound but this work was not proceeded with as the windings appeared sound and in fact tested satisfactorily.

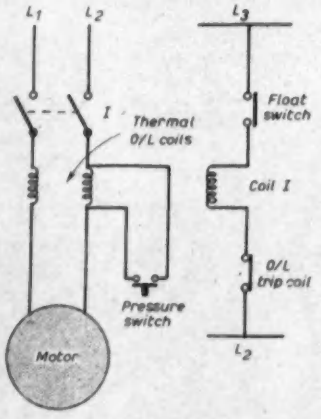
The terminal base had been removed and by a process of elimination this item was suspect and on close examination the trouble was eventually located behind the terminal block where tracking to earth had taken place this track causing carbonisation of the moulding. A new terminal base was fitted and the motor then operated quite normally.

Investigation of site conditions revealed that a certain amount of moisture was entering the terminal box and this resulted in surface leakage and tracking to earth. Rubber packings were fitted to the terminal box covers to prevent the entry of moisture and these steps eliminated the possibility of further trouble from this cause.—*"Torque."*

Control for Pump

THERE are numerous instances where electrically-driven pumps are operated by means of a float switch to lift water from wells, particularly in rural districts. This arrangement works well apart from the one possibility that, should the water-level fall below the suction, the float switch will bring the motor in and the pump will run dry. With some types of pumps this is liable to damage the pump.

This can be averted by incorporating a thermal o.l. unit rated at a little less than the normal current taken by the motor and fitting a small pressure switch in the delivery pipe (where thermal o.l.s are already fitted, the heater coil of one could be changed) is shown in diagram.



Circuit arrangements for controlling water pump motor with pressure switch protection

If now the water-level falls below the suction no water will flow in the delivery pipe, the pressure switch will remain open and after some 20 to 30 seconds the thermal o.l. will trip and remain out till reset by hand. Under normal conditions a few seconds after the pump starts water will flow in the delivery pipe, the pressure switch will operate and short out the o.l.s before it has had time to trip.—*A. H. Smith.*

Oval Commutator

A MACHINE was reported to have excessive arcing at the brushes. It was a d.c. generator in a Ward-Leonard system.

Attempts were made to "stone" the commutator and this led to the discovery that the commutator was oval. The armature was semi-bold, skimmed, undercut and replaced.

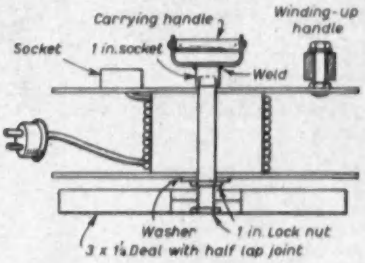
Several months later, the machine was suffering from the same defects, this time the armature was checked for mechanical balance, it was badly unbalanced. This was corrected and the machine re-assembled. No further trouble was experienced after several years of running.

The most likely explanation is, I feel, that the machine was continuously passing, or even running, at its critical speed, and the balancing of the armature tended to lessen the effects of running out of balance. The effects being to cause "brush hammer."—*R. T. C.*

Reel for Long Leads

I READ with interest the idea of C. T. Bower (17 Feb.) for a reel to hold long leads of flexible cable. It would appear to pay out the cable very well but entail a long and tedious job to rewind on to the drum.

The enclosed sketch shows the same drum and socket but mounted horizontally with a short piece of 1 in conduit for a spindle. This is fixed by two 1 in. lock nuts to a cross piece base made of two pieces of wood, half lapped together, the bottom nut being recessed. The carrying handle is a 1 in. socket welded to a piece of strip steel bent to receive a short wooden rod. The winding up handle is a short piece of wood with ¼ in. tube inside fixed to the drum with a 3 in. by ¼ in. coach bolt.



Alternative methods of using cable drum for long leads on portable appliances

I have four of these cable drums which have been in constant use for over two years with electric hammers, drills and other tools.—*C. S. Treadwell.*

'Static' Causes Deflection

EVEN in the orthodox field of d.c. engineering, things are not always what they seem, especially at high voltages. In the design of an electronic valve pumping "station" for high-power valves a rectified voltage of about 10,000 is applied to the grid and anode during bombardment; the current through the valve has to be controlled within close limits and for this purpose a standard moving coil meter reading about 1 amp is placed in the h.t. line. The metal case of the instrument is shielded by a plate glass cover, the meter itself being mounted, together with other controls, on a slate panel.

On switching on the h.t. for the first time the ammeter recorded a leakage current of about 0·2 amp. This was particularly odd as no valve was in place, and there did not appear to be any obvious leakage path. However, after a lot of fruitless investigation and various insulation checks, the mysterious "leakage" was discovered.

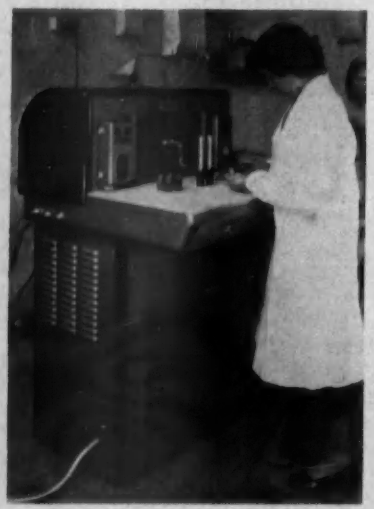
It was not a leakage at all, but a deflection due to the meter acting as an electrostatic voltmeter, the moving coil (at high potential) being sucked into the magnetic gap by electrostatic forces, the relatively poor insulation resistance of the slate being sufficient to maintain the case and magnet system at earth potential. When the coil of the meter was grounded to the case the trouble disappeared. I have since wondered how many m.c. instruments are in error due to this cause!—*F. N. S.*

Equipment for Industry

R.F. for Induction Heating

WITH the accent on reducing manufacturing costs, immediate attention is focused on any equipment which can reduce the time taken for a particular task. With their electronic forge, RADIO HEATERS LTD., Eastheath Ave, Wokingham, Berks, claim that the times for heating components to suitable temperatures for brazing and silver soldering operations can sometimes be reduced to under a quarter of previous times. In addition, brass and steel parts are raised to brazing heat so quickly that risk of distortion and scaling is reduced.

Heating of the workpiece is effected by radio frequency induction, the maximum power available being 6 kW. By employing a special wide variation controller the firm claim that for the first time it is possible to offer an electronic equipment flexible enough for either general workshop use or on mass-production lines. With this control, it is stated that the equipment can be set to provide its maximum output to any brazing or soldering work coil. The price is £875.



Heating components for brazing or soldering is effected speedily on this electronic forge

High-accuracy Current Transformers

DUE to the diverse requirements of high accuracy current transformers used in test rooms or laboratories, it is difficult to standardise on particular designs. However, FOSTER TRANSFORMERS LTD., South Wimbledon, S.W.19, have overcome this problem by introducing a range of multi-ratio current transformers which are designed to meet general requirements. A typical unit has a range of ratios from 0·5/5 A to 1,000/5 A in 11 steps. The equipment is housed in a polished hardwood case, the top of which is a terminal board with pillar-type terminals for selection of ratio and tapping. A secondary shorting switch is provided.

One of the standard multi-range current transformers

A typical product of the firm. Ratio 4000/5. Class AL. Burden 15 VA

Where accuracies higher than the usual AL or BL to B.S. 81 are required, an individual design has to be prepared. With up to 2,000 A primary current, little difficulty is encountered, but above this figure special precautions have to be taken to obviate any inequality of flux in various parts of the core due to position of the primary leads. As an alternative to providing a normal copper screen for this purpose, Foster's have standardised on including an auxiliary winding which they claim to have perfected. This winding consists of eight or more sections equispaced around the current-transformer and connected in parallel. When the primary is energised, the voltages induced in various parts of the auxiliary winding are evened out due to their connection, and hence the flux in the core is maintained equal at all points.

Measuring Receiver Noise Factor

DURING the past year MARCONI INSTRUMENTS LTD., Longacres, St. Albans, Herts, have been engaged in developing new electronic instruments for measuring various electrical and other quantities. One of their latest products is a noise generator type T.F.1053 which is suitable for measuring noise factors of receivers operating in the frequency range of 100-600 Mc/s. The noise factor of a receiver is obtained by dividing the signal/noise ratio at input by the same ratio at its output and may be expressed as a number or in decibels. The measurement is carried out by first checking the output level of the receiver due to internal noise when no input is applied, then injecting a noise signal from the generator sufficient to double the receiver output. The noise factor may then be read directly from the meter arranged on the generator front panel. In the T.F.1053, output is generated by a diode which has fixed anode potential and operates under temperature-limited conditions; all control being effected by varying the filament voltage and hence the anode current. The instrument is capable of measuring noise factors up to 150, equivalent to 21·7 db, and source impedance is 75 ohms. Full descriptions of this generator and the whole range of Marconi instruments are to be found in the 1955 Electronic Measurements Catalogue, which is now available to senior engineers and executives.

This instrument can measure noise factors up to 150, equivalent to 21·7 db

Combined Motor/Gear Units

TO meet the requirements of high torque and low speeds from small motors, PARVALUX LTD., Broom Rd, Parkstone, Poole, Dorset, are producing a range of motorised worm gear reduction units. With a single gear, a range of speeds from 20 to 690 r.p.m. with corresponding torques of 30 and 3 lb in. is available but where lower speeds are required, double reduction gear units have to be used. These are manufactured in four sizes only and cater for speeds from 0·3 to 19 r.p.m. with torques of 30 to 75 lb in. With both units drive is provided by an enclosed fan cooled motor of capacity ½ h.p., which may be either single or three-phase. For quiet operation, bakelised fabric gear wheels are used and the worms are of polished, hardened steel.

Plaster Depth 13 A Socket

COMPLYING with B.S.1363, the new 13 amp 3-pin socket introduced by VOLEX ELECTRICAL PRODUCTS LTD., Salford, 6, can be mounted in any "plaster depth" box having ¼ in. internal depth and fixing centres to B.S. 1299.

The firm emphasise that they believe this to be a considerable step forward since it makes possible the use of the same boxes for both switches of plaster depth and 13 amp 3-pin sockets and in both cases mount within the depth of normal plaster.

This socket has a front projection from the wall of 3/32 in. greater than the normal 13 amp socket and is available in brown (No. 1304) and cream (No. 1304 CR).

TRADE PUBLICATIONS

ELECTRONICS.—A booklet describing the organisation and work of the factory at Cheadle, Cheshire, has been issued by F. C. Robinson and Partners Ltd., 287 Deansgate, Manchester 3.

CABLES.—"Radio Frequency Cables" are the subject of a booklet (495) issued by W. T. Henley's Telegraph Works Co., Ltd., 95 Aldwych, W.C.2.

AIRPORT EQUIPMENT.—"Airport Electrification" and the equipment required is detailed in a brochure, Aero 2532, issued by the General Electric Co., Ltd., Magnet Hse, Kingsway.

LAMPS.—Atlas projector and photographic lamps are described in a broadsheet issued by Thorn Electrical Industries Ltd., 105 Judd St, W.C.1.

CABLES.—C.M.A. Rubber and Thermoplastic insulated cables are described in a brochure, E.N.103, issued by Enfield Cables Ltd., Victoria Hse, W.C.1.

RECTIFIERS, ETC.—Static magnetic comparators type MCU designed by the Nevelin Electric Co., Ltd., Purley Way, Croydon, are described in list W.R.350 issued by the company.

DUST CONTROL.—Dallow Lambert and Co., Ltd., Spalding St, Leicester, have issued a leaflet describing their automatic staker type E.A.1 for dust control units.

ARC FURNACES.—Comprehensive information on the G.W.B./Tagliaferri range of arc furnaces is available in brochure form from G.W.B. Furnaces Ltd. P.O. Box 4, Dibdale Works, Dudley, Worcs.

ALUMINIUM.—"Aluminium Alloy Sections for Marine Use" is the title of an addendum to Information Bulletin No. 18, issued by the Aluminium Development Association, 33 Grosvenor St, W.1.

MOTORS.—A recent publication of Laurence Scott and Electromotors Ltd., Gothic Works, Norwich, is an extremely useful booklet dealing with their standard range of marine type a.c. motors together with some general remarks on the use of alternating current for ships' auxiliaries.

SCIENTIFIC EQUIPMENT.—New leaflet 294B issued by the Cambridge Instrument Co., Ltd., 13 Grosvenor Place, S.W.1, describes the firm's redesigned direct reading pH indicator.

Tectona Table Lamps

EMPLOYING Burma teak bases carefully selected and well finished and pottery bases by reputable firms, "Tectona" table lamps and shades are a product worth stocking.

Contemporary and popular traditional styling is evident in the range by METWOOD ACCESSORIES, Church St, Wolverton, Bucks. Shades are in parchment, veneer, acetate, buckram, crinothene and check gingham, in "coolie," "Empire" and "scalloped" shapes. All shades are made by hand in firm's workshops and have bound frames and double cotton seaming. Trimmings are available in 17 colours, light blue, dark blue, ivory, cream, pink, wine, nigger, light and dark green, beige, both pink and light, brown, rose, peach, gold and rust. "Tectona" lamps are supplied with polished brass push-bar holder and eight ft of flex whilst some of the smaller are fitted with brass holder and torpedo switch.

Eltron Water Heaters

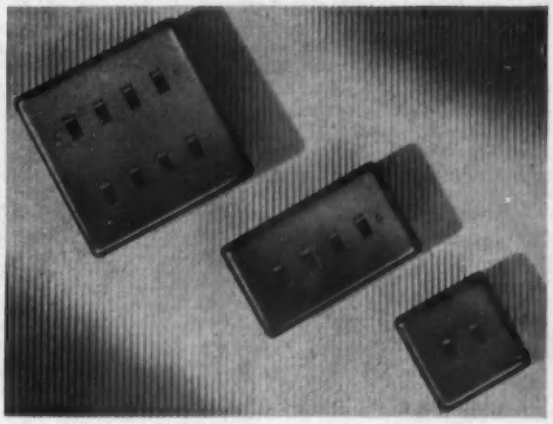
EXTENSIVE range of water heating equipment produced by ELTRON (LONDON) LTD., Accrington Works, Strathmore Rd, Croydon, Surrey, is surveyed in a leaflet issued by the firm.

Apart from industrial heaters there is now available a series of ring immersion heaters (TL) in various loadings for boiling small quantities of water, a larger type is the TR rod immersion heater loaded up to 3 kW. The portable units designed for use with the Hoover, Goblin and other washing machines are well known to readers. Probably not so familiar are the Type DN instantaneous type heaters which loaded 2 kW, automatically make the heater circuit when water tap is opened and likewise breaks circuit when tap is closed, the EB5 1½ gallon push-button/thermostat uninsulated water boiler, and the non-pressure type SN3 under basin water heater which with 2/3 gallon capacity is loaded at 1 kW.

M.K. to Introduce "Gridswitch"

DUE for introduction next month by M. K. ELECTRIC LTD., Wakefield St, Edmonton, N.18, is an important addition to the M.K. range—the "Gridswitch."

The flush "Gridswitch" has been designed with the current building programmes in mind when attention is being paid to the style and quality of electrical accessories for use in these new buildings. The Gridswitch range is made up of interchangeable units for easy stocking and versatility. The switches are mounted on removable grids, a point of design which simplifies wiring. The whole unit fits into flush boxes, deep drawn and seamless, which provide ample stowage space for the cables. Insulated and solid brass plates are available for choice; the latter may have protected or non-protected switch dollies. The insulated pattern is available in up to four gang units extended in the case of the brass plate pattern to eight gang. Finishes in the insulated range are brown or ivory whilst standard BMA and matt chrome finishes are available for the metal type.



These 2, 4 and 8 gang switches are interchangeable respectively with 1, 3 and 6 gang types

For the Electrical Trade

•

Controlite by C.P.

CLIP-ON neck reflector, the "Controlite" by COURTNEY POPE (ELECTRICAL) LTD., Amhurst Park Works, Tottenham, N.15, is designed to convert a 150 W general service lamp into a highly efficient modern spotlight fitting. Manufactured in super purity anodised aluminium 5¼ in. overall diameter and 4¼ in. deep, the reflector clips directly on to the lamp. It is listed at 16s. 6d.

A further accessory to be used with the reflector is the "S.K." swivel knuckle lampholder which consists of a skirted lampholder, knuckle joint and swivel ceiling plate (2 in. fixing centres).

Sales Development in Queensland

Domestic Expansion follows Adequate Power

IN addition to recording a very successful year, the 17th annual report of the State Electricity Commission of Queensland also refers to the happier power situation in the State now that additional generating capacity has been installed. The major extension was Bulimba "B" power station, where two 30 MW sets were commissioned. A third 7,500 kW machine was installed at Howard power station, while further progress was made in the Commission's scheme to provide power plants for small isolated townships—26 small places now have such supplies. Results achieved from these isolated plants indicate that the systems are sound both technically and financially. Reconstruction of supply schemes and other conversion work continued, so that now, apart from a part of Brisbane and a few small centres, the State is served by a standard a.c. 240/415 V system.

To further brighten the outlook the first 30 MW set at the Brisbane city council's Tennyson power house should be available for the winter of 1955, with a second set to follow shortly after, while the Tully Falls hydro-electric scheme is also nearing completion. This latter project is of vital importance to the Cairns region, and although much of the main machinery has been on site for some time it is not expected that the underground power house will be ready for the installation of the plant until the second quarter of 1955. With such delay in the availability of the site it seems unlikely that the machines can be running this year. Meanwhile the erection of 132 kV transmission lines has been almost completed.

Interconnection

The Commission and the Cairns and Townsville Regional Electricity Boards have investigated the possibility of interconnecting the two regions so that supply can be made available from the Tully Falls power station to the Townsville Board. It is considered that such an interconnection would be to the advantage of both regions by ensuring the fullest possible use of plant at Tully Falls, saving the installation of further coal-burning generating plant at Townsville. The high landed cost of coal in Townsville makes it essential to develop all hydro-electric power resources in that region, and plans are being developed to that end.

An important development in South-Eastern Queensland during the year under review was the acquisition of the Toowoomba Electric Light and Power Co. by the Southern Electric Authority of Queensland. As a result, the S.E.A. is responsible for an area of supply of 19,750 sq miles. In this large area special efforts have been made in transmission and distribution works—some 105 miles of 110 kV line were erected, to superimpose on the existing 33 kV systems.

On the trading side, a total of 206·8m units were sold by the four regional Boards, plus 500m units by the Southern Electric Authority—an increase of about 10%. The Commission operates a central purchasing department, and during the year ended 30 June last placed orders for appliances valued at over £200,000—almost double that of a year earlier—including over 1,000 refrigerators. During the twelve months ended 30 June last, 4,863 electric cookers were installed, together with 6,762 storage water heaters, 2,929 wash boilers and 763 absorption-type refrigerators — an indication that an active sales policy is being pursued now that there is no risk of power cuts. The Townsville Regional Electricity Board reports that the percentage of hire-purchase sales to cash sales was 84% to 16%. The minimum deposit of refrigerators has been reduced from 20% to 10%, which should assist in maintaining sales.

The Capricornia Regional Electricity Board is erecting a new three-storey administrative building, which apart from providing ample accommodation for the staff will include a modern showroom. Finally, as a further indication of the amount of work in hand, it is shown that the programme of electrical development for all public authorities in the State to be financed from loan funds during the financial year 1954-55 involves an estimated expenditure of over £16½m, of which £4·6m is by the Southern Electric Authority.

Brazil's New Hydro-Plant Project

EARLY this year the President of Brazil inaugurated the new Paulo Afonso power station on the river Sao Francisco, which, he said would usher in a new era in North East Brazil. This station marks the first step toward the utilisation of the vast potential of this river to provide both power and irrigation over the so-called "drought area" of Brazil which is almost as large as France. The area concerned held, at the 1950 census, some 10,966,000 people, about 20% of Brazil's entire population, many of whom have to migrate to other areas during drought periods, and it is hoped that the introduction of combined irrigation and hydro-power will enable industry to be established, the population to be more permanent, and will ultimately lead to a considerable increase in the agricultural production of the area.

Plant Installed

At the moment, the plant installed at Paulo Afonso, which is an underground station, is composed of two generator groups, each consisting of an 83,000 h.p. vertical Francis turbine directly coupled to a 60 MW generator. These are connected to the main transmission system through two banks of 3 single-phase transformers, each one of which is rated at 22·5 kVA with a voltage ratio of 13·8 to 220 kV. A third 60 MW plant will be installed shortly, and a second underground power station is under construction.

The project is located approximately 200 km inland from the Atlantic coast, half-way between Recife and Salvador, and two 220 kV transmission lines deliver power south to Salvador and north to Recife. Four 220 kV substations are located at Recife, Paquevira, Itabiana and Salvador. The lines are 456 and 405 km long respectively, and the substation capacities are Recife 66 MVA; Salvador 33 MVA; Paquevira 16 MVA and Itabiana 16 MVA. There is in addition a frequency converter station at Recife 50/60 c/s, with a capacity of 30 MVA.

A distribution system is associated with the primary transmission, and consists of 969 km of 66 kV lines of which 60 km are double-circuited, and 178 km of 13·8 kV lines. There are nine substations associated with the 66 kV system with a total capacity of 76 MVA.

The transmission system has already been completed, and should now be operating. Work on the secondary system is well advanced and should be completely finished in 1956. An extension of the network will be made with the installation of the third 60 MW set, when a new 220 kV substation of 33 MVA will be placed in the Catú region in Bahia, and a secondary distribution system will take power to the Catú-Alagoinhas area.

The major part of the plant has been imported from America, being manufactured by Westinghouse Electric International Co. Their contract included the three 60 MW generators and turbines, step-up and step-down power transformers, switchgear, control equipment, two 15 MW frequency changers for Recife, and one 20 MVA synchronous condenser for Sao Salvador. The turbines themselves were built under subcontract by Dominion Engineering Co., in Montreal. The total Westinghouse contract was more than U.S. $8 m of which about U.S. $1 m went to the Dominion Engineering Co.

It is hoped that the three 60 MW sets will be able to deal with load demands from the area up till about 1959.

NEWS OF THE WEEK

New Curb on H.P. Spending

15% Deposit and Limited Repayment Periods Imposed

REIMPOSITION of regulations governing sales of goods under hire-purchase arrangements were announced by the Chancellor of the Exchequer last week. After seven months of absolute freedom in this form of trading, the Chancellor decided to restrict hire-purchase as one of two measures aimed at halting an adverse trend in the country's balance of payments situation. Under an Order issued coincidentally by the Board of Trade the minimum initial deposit is 15% of the cash price of goods, and the maximum period of repayment of the balance is two years for most items affected, and four years for others. The Order became operative immediately; as from 24th February. Numerous electrical appliances are included in the list of goods where repayments must be completed within two years. They are space heaters, dish washers, drying cabinets, washing machines, irons, floor polishers, vacuum cleaners, water softeners, refrigerators with capacity of 12 cu ft or less, food mixers, kettles and other cooking utensils incorporating heating elements, electric hot-plates, dry shavers, sewing machines, hair dryers, clocks, radio and TV sets, aerials, cathode ray tubes, and radiograms. Repayments must be completed within four years in respect of water heating appliances, cookers and also washing machines designed to heat water by electricity but not otherwise made for operation by electricity, and wash boilers.

Although cookers appear on the second list, the maximum period of four years will cause much revision of terms among the Electricity Boards. Consumers have been allowed to repay the cost of cookers over a period as long as 15 years in the case of the N. Eastern Electricity Board. In most Areas there has been agitation to lengthen the period of repayment, and to some purpose. In S. Wales, for instance, when the time was extended from five to ten years only a year or two ago, sales almost doubled from 3,581 to 6,411 in a year. Not many months ago the S. Eastern Board were persuaded to allow five years instead of three, but those who have urged a further extension to seven years will now have to suspend their campaign.

Current restrictions are not, however, as stringent as those imposed in February 1952. At that time the initial deposit was fixed at 33⅓% and only 18 months was allowed to pay the balance. Those restrictions were revoked last July although the limitations of finance for hire purchase remained.

Natural public reaction in the few days since the Chancellor's announcement has been one of reticence, but general opinion in trade circles seems to be that the restrictions will make little difference. The action is regarded as reasonable and will make for sounder business. Mr Butler asserted that hire purchase transactions had got out of hand. He said the orders made were designed to deal with the immediate situation but it was the Government's intention, as soon as the opportunity arose to seek permanent powers. He was also asking the Capital Issues Committee and the banks to adopt more restricted attitudes towards finance for hire purchase.

The text of Mr Butler's letter to the Capital Issues Committee was given in a Parliamentary written answer on Friday. In a similar letter last August the Chancellor asked that not too rigid a ban be imposed on new finance for H.P. Last week he asked the Committee "to examine more stringently any application for finance for this purpose."

N.A.T.O. Orders for British Companies

THREE orders with a total value of some $26¼m for electronic equipment have been placed with British firms. They were negotiated with the Hazeltine Electronics Corporation of New York under their offshore procurement prime contract with the U.S. Navy Dept. The equipment is for supply to N.A.T.O. countries. The British Thomson-Houston Co., Ltd., has secured an order for $11¼m worth of equipment, the General Electric Co., Ltd's. contract is valued at $10¼m, and Ferranti Ltd. will supply $4¼m worth.

New Domestic Appliance Company formed

FORMATION of a new company to manufacture domestic electrical appliances was announced by Sir Charles Colston, former chairman of Hoover Ltd., on Monday. Among the new products to be made by Charles Colston Ltd., as the concern will be called, will be a washing-up machine and an ironer. It is emphasised that the company will not compete in any way with Hoover Ltd., although the latter have no financial interest in the concern. Nominal capital of Charles Colston Ltd. will be £100, and permission is being sought from the Capital Issues Committee to issue shares valued at £500,000. As regards accommodation, a factory has been acquired in Aycliffe, Durham, costing around £100,000 and having an area of about 35,000 sq ft.

E.C.A. Presidents to plan Future Development

WITH the idea of planning ahead in respect of future developments in the electrical industry, particularly concerning electrical contracting and retailing, a committee of post-war past-presidents of the Electrical Contractors' Association has been set up. The committee, which has already had one meeting, is confining its consideration to matters concerning future policy. Members of the Association are invited to submit to the committee suggestions or views on any subject which would come within its scope.

Electrical Section of B.I.F. in London?

INDUSTRY TO BE ASKED ABOUT MOVE FROM CASTLE BROMWICH

IN the next few days, manufacturers and others in the electrical industry will be asked if they would be willing to support an electrical section of the British Industries Fair in London. A questionnaire is being prepared by British Industries Fair Ltd. in London and Birmingham Chamber of Commerce, but at the time of writing it had not been finalised, nor, we understand, had it been decided whether it should be sent to past and present exhibitors only, or to a wider section of the industry. The sad decline in the popularity of the Fair's electrical section, staged at Castle Bromwich, has been evident for some years. This year the Midlands show will not be truly representative of the electrical industry by any means. Support for the proposed transfer of the B.I.F.'s electrical displays to London will, of course, be a strong challenge to the Electrical Engineers (A.S.E.E.) Exhibition, which has made such rapid progress in its five years' existence. The two shows are undoubtedly different in their outlook, but the challenge will exist.

Electric Blanket Sales up by 50%

Manufacturers have Big Expansion Plans for Future

IF the recent bitterly cold spells throughout the country since Christmas have been unpleasant for the majority, at least it has added momentum to an ever increasing demand for the electric blanket, with consequent benefits for the manufacturers. Enquiries in the trade have confirmed that electric blanket manufacturers are increasing sales year by year, and that this winter has been their best season ever. Sales are well over 50% greater than in 1953-54 and the majority are making provision for a similar increase next year. One prominent blanket maker put this season's increase as high as 75%, and the lowest percentage increase mentioned was 45%. Although these figures are significant in themselves, even they do not give the true picture because the number of firms recording them has increased rapidly each year. At present there are about forty companies making electric blankets; about double the number five or six years ago and compared with under 10 in 1945-6.

One of the main reasons for the steady rise in business, apart from cold weather spells of course, is said to be that the public regards the electric blanket much less suspiciously now than in yesteryear. The appliance is also being looked upon as less of a luxury. Exports too are increasing, although there is keen competition from the U.S. and Germany. A pleasant outlook for the trade lies in the fact that it is gradually becoming an all-the-year-round industry. Hitherto it has been a seasonal business with the resultant difficulties involved in building up and carrying large stocks in the summer months. Trade with countries in the S. Hemisphere tends to help in this situation but they are still inclined to clash with the end of our winter demand.

Plans for increasing output are being prepared by nearly all manufacturers although many have doubts as to whether they will be able to cope with demand. This year demand has easily exceeded supply with production capacity strained to its limit. At present a two-weeks' delivery date appears to be common.

Soak Test Conveyor speeds TV Production

A new "soak test" conveyor has been installed at the Romford works of Regentone Radio and Television Ltd., to speed up the testing of TV chassis before final assembly and despatch. For satisfactory testing several hours of continuous operation are necessary. Supplying electricity to the individual chassis whilst in motion presented problems which were overcome by using miniature current collection arms running along hard-drawn copper bars. Each bank of three chassis is supplied with two of these arms which are completely swivelling. They were specially developed for Regentone by British Insulated Callender's Cables Ltd. Each arm is fitted with a carbon insert slipper head to minimise the risk of sparking

New Showrooms in Huntingdon for E.E.B.

SHOP premises in the High St, Huntingdon, have been acquired by the Eastern Electricity Board. They were previously occupied by Miller and Sons Ltd., and after extensive alterations will be reopened as showrooms and offices. The board's present showrooms are in George St, but they will be closed in due course.

OFFICIAL PUBLICATIONS

E.R.A. REPORTS.

G/T298: Flameproof Electrical Apparatus, Flange Joints, One Inch in Radial Breadth, in Mixtures of "Standard" Town's Gas and Air, by T. J. A. Brown and N. Simpson, 7s. 9d.; G/T299: Maximum Experimental Safe Gaps, Note on the Emission of Flame through Flange Gaps, by T. J. A. Brown, 4s. 9d.; IB/T14: Energy Survey in Somaliland Protectorate, by E. W. Golding and A. H. Stodhart, 21s. 4d.; L/T295: Onset of Breakdown in Gases Subject to Superposed Microwave and Unidirectional Electric Fields, by W. A. Prowse, Elizabeth Laverick and W. Jasinski, 7s. 9d.; L/T299: On the Motion of Slow Electrons in Polar Materials, by S. Zienau, 12s. 9d.; and L/T314: Case for Adoption of British Plastic Yield Test as the I.E.C. Standard, by A. Morris Thomas, 12s. 9d.

PROSPECTS OF EXPORTING ELECTRIC POWER FROM YUGOSLAVIA (see page 350). Available from H.M.S.O. 3s. 9d.

HIRE PURCHASE AND CREDIT SALES AGREEMENTS (control) order, 1955 (see page 369). H.M.S.O. 4d.

1954 PROGRESS WITH TIN

LAST year many important developments were made by the Tin Research Institute and particularly featured among these was the success achieved in bonding aluminium-tin alloy to steel backing for bearings. Laboratory tests have shown that such alloys when used in bearings, can stand a load as great as 6,000 lb/sq in. and still retain excellent running properties. Another step forward has been made with the semi-continuous castings of bronze. A full report on these and other activities is contained in the "1954 Annual Report of the International Tin Research Council."

Another Rise for Electrical Contractors

EMPLOYEES in the electrical contracting industry are to get an increase in pay, with effect from 14 Mar., as the result of an agreement between the National Federated Electrical Association and the Electrical Trades Union. Wages for journeymen electricians will be increased by 3d. an hour in all areas, with corresponding increases in the rates for other employees. Having accepted this new offer of the N.F.E.A. the Union's early proposal to hold a strike ballot has been dropped. The new rates of pay are set out in the accompanying tables. For returned apprentices the respective hourly rates under clause 2(b) and 2(c) are 3s. 10½d. and 4s. 1d. in grade "A"; 3s. 6½d. and 3s. 8½d. in grade "B" and 3s. 7½d. and 3s. 9½d. in Mersey district.

Journeymen electricians in the contracting industry received a rise of 2d. in March last year, and certain other employees received a further increase in June.

Journeymen		Adult Mates	
Grade "A"	4/5½	London ...	3/8½
Mersey District	4/1½	Bristol ...	3/4½
Grade "B" ...	4/0½	Mersey ...	3/3½
		Elsewhere ...	3/2½

OTHER NEW WAGE RATES

Apprenticeship Scheme Category I and II				Category III boys		
Age	Grades A	Grades B	Mersey dist.	Grades A	Grades B	Mersey dist.
15	10½d.	9½d.	10d.			
16	1/1½	1/0½	1/0½			
17	1/4	1/2½	1/2½			
18	2/–	1/9½	1/10½	1/11½	1/9½	1/10½
19	2/5½	2/2½	2/3½	2/6½	2/3½	2/4½
20	3/1½	2/10	2/10½	3/1½	2/9½	2/10½

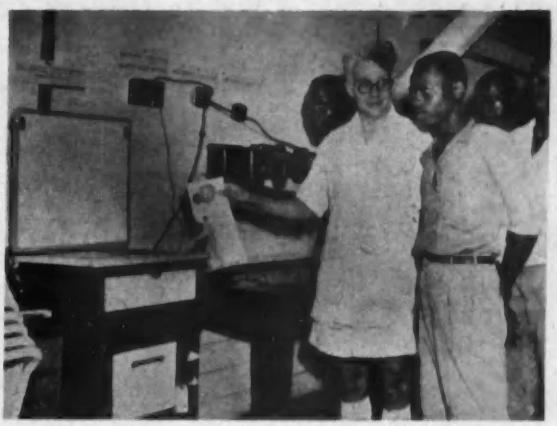
Royal Society Awards 1954 Art Bursaries

SUCCESSFUL candidates in the Industrial Art Bursaries Competition of 1954 were named by the Royal Society of Arts last weekend. There were 13 sections dealing with different aspects of industrial design, and altogether 292 candidates entered for the contest. Two of the sections directly concern the electrical industry. Mr P. D. Durden of Birmingham College of Arts and Crafts won a bursary of £150 in the domestic electrical appliances section. Mr Durden, incidentally, won a £75 bursary in 1953 in this section. In the lighting fittings section, Mr D. B. Gale (L.C.C. School of Arts and Crafts) won a £150 bursary. An exhibition of designs submitted will he held at the Royal Society between 16 and 28 May. Details of this year's competition will be given in May. Closing date for entries will be 10 October.

Batti-Wallahs' at Lunch

SPEAKING at last Thursday's Batti-Wallahs' luncheon, Major N. H. Golding, the principal guest, gave a most interesting and instructive talk on prisons and prison life—as seen by the Prison Governor—with particular reference to the modern concept of the "open" prison.

The next Batti-Wallahs' luncheon will be on Wednesday, 30 Mar., when the speaker will be Captain George Eyston of motor racing fame.



Our photograph from British West Africa shows Mr John Mellanby demonstrating Siemens' earth leakage trips. The cardboard model of a cook which he is holding showed clearly what happened when he touched the cooker with his frying pan when the faulty hotplate was switched on—the lamp lit up. Hundreds went to see the demonstration which the local Press called the "Electric Shock Exhibition"

Electrical Prospects in Rhodesian Federation

OF particular interest in the Overseas Economic Survey of the Federation of Rhodesia and Nyasaland, published recently by the Board of Trade, is a section dealing with the African native market. Although it would not be right to expect a great potential market for many goods among the African natives, "no forward-looking exporter can afford to neglect it," the survey states. The African's purchasing power has increased during the past few years, and although there are numerous factors involved, a continuing, if slow, prosperity can be expected. The settled African families are now furnishing their homes (provided by employers or local authorities) in European fashion and buying such items as radios and irons, and even cookers. The extension of electricity to African townships is proceeding. In S. Rhodesia, for example, plans are in hand for wiring some 10,000 houses, and in the newer townships, houses are being wired as they are built. First use of electricity is, of course, lighting, followed by irons, radios, boiling rings and stoves.

The African native market, apart, however, the growing needs of the Federation for power and communications make electrical equipment a highly important group of imports, of which the U.K. has so far enjoyed by far the largest share. A great deal of attention is paid to the electricity supply industry of this area in the Survey, and a detailed reference would be impossible here. All electricity undertakings are planning large increases in output. Over the next four years the Supply Commission in S. Rhodesia expects to spend over £3 millions on generation and £7 millions on distribution. Demand from new copper mines is expected to rise rapidly during the next decade. Severe strain on available coal supplies has turned attention to hydro-electricity. The survey gives an admirable picture of the electrical situation.

Apprentices with S. Wales Switchgear Ltd., gained three of the five awards made annually by the Engineering and Allied Employers S. Wales Association to the best engineering apprentice in each age group. The successful students were Ng Wing Yuen, J. Baker and J. H. Lewington

ABOLISH SOLID FUEL, SAYS LORD MAYOR

IT may not be considered very tactful to attack coal as a dirty, inefficient and expensive commodity when proposing the toast of the Coal Utilisation Council, but that is exactly what the Lord Mayor of Birmingham did at a luncheon of the Council's Midland Region last week. The Lord Mayor asserted that all efforts should be concentrated on eliminating solid fuel as a heating medium in the home. Listing the ill-effects of coal, he alleged that rooms filled with dust each time the fire was poked. The same thing happened when the grate was cleared, with disastrous effects on furniture, curtains and carpets.

Having the somewhat difficult task of replying to the toast, Sir John Charrington, the Council's vice-president, pointed out that smokelessness would have to come slowly. He reminded the Lord Mayor that if every home was electrically heated, some power stations would have to be idle for 50 weeks of the year. While smoke was visible, there were many invisible gases poisoning the atmosphere, just as deadly, he said.

Apathy in Thornaby

IT is reported from Thornaby in Yorkshire that because of lack of interest on the part of council house tenants, the corporation will take no further action concerning the installation of electric cookers in their houses. In a recent enquiry 1,545 letters were sent out to tenants but only 104 were answered, and of these only 41 were in favour of electric cooking.

Efficiency Filmed

THE advantages of installing special purpose machines instead of using conventional lathes, millers and grinders was clearly shown when a film of Ferranti Ltd., meter production, was shown last week by the Film Producers Guild. Drilling and machining the cast-iron frames took 43 separate operations prior to the installation of this type of machine. Similarly in the bakelite moulding operations, one operator, with two separate machines, can produce the whole of the meter production requirements. The combination of various streamlining processes throughout the plant has resulted in a considerable increase in the firms output of house service meters.

Dealers to be invited to Breakfast and Dinner

BREAKFAST and dinner parties for local dealers, similar to those organised by American manufacturers on the other side of the Atlantic are to be inaugurated in this country by Sunbeam Electric Ltd. Sunbeam are the British subsidiary of the Sunbeam Corporation of Chicago, and were formed only last summer with offices in London and a temporary factory at Hillington. Work has now started on their factory at East Kilbride. Eventually, the whole of the parent company's range of electrical appliances will be made available in this country but to date only their electric shaver and food mixer have been introduced to the British market.

A number of breakfasts have been held in various provincial towns, notably at Guildford, Maidstone, Southampton and Bournemouth, as an experiment, and have proved successful. It is planned to stage the breakfasts in the majority of cities throughout the U.K. as from the spring. They will of course publicise the Shavemaster, and dealers in the area concerned will be invited to attend. Advertising of the Shavemaster, confined to the Home Counties originally, was extended on a national basis in December.

The dinners will be organised on a similar basis but will also be used to publicise the Mixmaster among invited dealers. National advertising of the mixer is beginning now. Plans for these parties have yet to be finalised.

Plans for New By-Laws to Prevent Fires

PARTICULAR attention is likely to be paid to the safety of electrical appliances and installations when plans for new model building by-laws designed to give a greater degree of fire prevention are discussed. The plans are now being considered by the Ministry of Housing and Local Government and local authority associations. They follow the report on the Reading Maternity Home disaster last year when 13 children died.

The First Half-Century

The police made a great haul of motorists last Sunday week at Bolney, where a measured furlong and a new electrical timing apparatus constituted the material of the trap worked by the trained hands of the police, and on Monday last the cases came before the magistrates at Haywards Heath. There was the usual contradictory evidence and the usual magisterial incapacity to judge of its value, while the fines were rather heavier than usual. P.C. Waghorn stated that the machine and cable were made by Lord Kelvin—presumably he meant "designed" — whereon Mr Staplee Firth, who represented some of the defendants, remarked: "Oh never mind Lord Kelvin! He is very good on taps and deep sea soundings, but I have not heard of him coming out on electricity before."—*From our issue of 2nd Mar.*, 1905.

Shave Yourself Service at Walsall Barbers

INTRODUCTION of an electric shaver for a special customer at a barber's shop in Green Lane, Walsall, has grown into a flourishing "shave-yourself" business. The hairdresser bought the shaver for the benefit of a regular old-age pensioner, but soon more customers were requesting an electric shave in preference to the lather and brush. The self-shave service grew and necessitated the installation of a second shaver, and now men from nearby factories even call after work for a quick shave before a date. The charge incidentally is 6d. per shave. There would appear to be scope here for electric shaver manufacturers to publicise their products.

Damages Claim against London Board fails

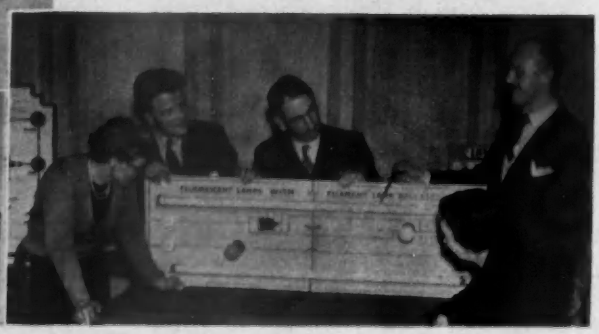
IN the Queen's Bench Division of the High Court recently an electrician employed by the London Electricity Board claimed damages for injuries sustained when he fell while moving through a passage in a substation. His foot missed the edge of an open duct and he claimed there was no grill or checker plate over the duct and that the lighting was inadequate. The case is reported only on the claim for breach of statutory duty. The plaintiff invoked Regulation 26 of the Electricity (Factories Act) Special Regulations 1908 and 1944 which required "all those parts of premises in which apparatus is placed shall be adequately lighted to prevent danger." This was an absolute obligation. It was held, however, that danger could not refer to damage from a fall as the definition in the regulation said "'danger' means danger to health or danger to life or limb from shock, burn or other injury to persons employed" and other injury must refer to some form of electrical energy following as it did shock and burn. It was held therefore that the electrician could not succeed in his action.

NEWS IN BRIEF

Industrial television equipment is being supplied by Marconi's Wireless Telegraph Co., Ltd., to the U.K. Atomic Energy Authority for the observation of conditions in a reactor which has been in service for some years.

Branch and District Cups have been presented to successful managers by Hoover Ltd. Winners were the North-East branch (Mr G. Wall) and the Darlington District (Mr D. Harper).

Contract for building work at the Norwich Television and V.H.F. sound transmitting station has been placed by



Electricity Boards are paying particular attention now to the training of their sales staff. Left is one of the demonstration rooms at Avoncroft College, Bromsgrove, arranged by the Midlands Board for practical training of new recruits to their service centres. Details of M.E.B.'s new training scheme were exclusively reported in our 20 January issue. Bottom left, Mr S. M. Ashe, in charge of the course, instructs four trainees. Below, members of the S.E. Scotland Board receive some instruction from Mr R. M. T. Wilson and Mr T. O. Freeth during a 5-day Commercial Staff Training Course in Edinburgh

the B.B.C. with J. Youngs and Son Ltd. Installation of plant is expected to begin during the late summer, and the station may be in operation in mid-1956.

Recommendation before Kidderminster council is that houses on their new Habberley estate should be equipped with 50% electric cooking and washing appliances and 50% gas appliances.

Radiant floor heating system at the printing works of Gatwick Press Ltd., at Crawley, is notable for the use of "Ductube" pneumatic tubing to form hot air ducts in the sub-floor. Although quite common overseas, it is not at all common in industrial establishments in this country.

An exclusive licence for the U.S.A. has been granted to Voltarc Tubes Inc., by Claude-General Neon Lights Ltd. It concerns the latter's invention whereby an electrode prevents end-dulling of cold cathode fluorescent tubes when temperatures drop.

Scientific Instrument Manufacturers' Association are holding their annual dinner and dance at the Dorchester Hotel, London, on 15 Apr.

"Heaven and Charing Cross," the thriller by Aubrey Danvers-Walker, was the play recently performed by the talented amateur dramatic society of Johnson and Phillips. All three performances were exceptionally well attended.

Nearly 450 members of the Staff Association, and their guests, were present at the seventh annual dinner and dance of Telcon and Submarine Cables Ltd., at the Dorchester Hotel.

Latest contract signed between the B.B.C. and Marconi's Wireless Telegraph Co. Ltd., for equipment for the Crystal Palace TV station concerns the transmitting aerial array. This follows order for two vision transmitters, two sound transmitters, control and monitoring equipment, two Vestigial sideband filters, two combining units and the main transmission lines.

Wild-Barfield Electric Furnaces Ltd. have decided to re-issue their Heat-Treatment Journal, which ceased publication because of the war. The first of the new series is being despatched this month.

The 100 Good Catalogues Exhibition has already visited seven large centres in England and Scotland, but the Council of Industrial Design have planned a busy itinery for the spring. The show will visit Rochester, Southampton, Norwich and Colchester before going on to the South West and Midlands.

Fourth annual Sportsman's Dinner of Johnson and Phillips' Sports Club was held in the works canteen recently. Attendance was the best yet.

Stockport's town hall has been taken over by the N.W. Electricity Board this week for cookery and laundry demonstrations. There is an exhibition of electrical appliances at the same time.

QUESTIONS IN PARLIAMENT

Peaceful Uses of Nuclear Energy

A DEBATE on the Peaceful Purposes of Nuclear Energy took place in the House last Friday. It was introduced by Mr R. Bell. In the main he and subsequent speakers praised the work which was being done to develop nuclear energy, particularly as regards the generation of electricity. A number of points were raised, however; notably on the subjects of trained scientific men and on the safety aspect. Mr A. Palmer answered critics of the past who alleged extravagant capital expenditure on the part of the B.E.A. He said the recent White Paper fully justified the large-scale electrical development which had been carried on, because without it the new nuclear energy could not be taken to the factories, homes and plants. Mr Palmer asked what was to be the balance in economic planning between capital expenditure on nuclear energy and on the coal industry.

In his reply, Mr Nigel Birch dealt with all the points raised. On coal he said that despite increased use of nuclear power there would also be increased demand for coal. In 1975 demand for coal without nuclear power would be about 100m tons, but the new source of energy would reduce that figure to about 60m tons. On the availability of trained scientists, Mr Birch said all departments —the Atomic Energy Authority, B.E.A., Ministry of Education, and technical schools, colleges and universities—were all making special efforts. It was hoped that universities would gradually do more by giving basic courses in nuclear and reactor physics. The Minister's final point was safety. He said most stringent precautions had been taken in all stations, some said they were too stringent. The safety record was extraordinarily good. As had already been pointed out, he said, there could be no atomic explosion in a nuclear power station because fissile materials were so diluted with other materials that there could never be a critical mass sufficient to cause such an explosion.

Board Members' Salaries

AN increase in the salaries of members of the Boards of nationalised industries was advocated by Mr J. Grimond last week. The question arose following the Report of the Advisory Committee on Organisation of the N.C.B. Replying, the Prime Minister said that all the recommendations in the Report would have to be reviewed by the newly constituted board. Moreover, he said, any increases could only be decided in relation to a review of remuneration in other industries. The committee advocated that some members of the N.C.B. staff should receive £7,500 p.a.

In a written answer, the Chancellor of the Exchequer told the same questioner that the net salaries, after tax, of chairmen of the Transport, Gas, Electricity and Coal Boards were £3,425, £2,887, £3,425 and £3,225 respectively. These figures assumed that any allowances received in addition to the basic salary were completely absorbed in meeting expenses allowable for tax purposes.

Meter Reading

THE introduction of a meter in all premises having gas and electricity which would measure the consumption of both on the same meter was suggested by Mr H. H. Lewis. He maintained it would save the necessity of employing two meter readers, but Mr L. W. Joynson-Hicks said such a service would not be practicable.

Capital for Nuclear Power Stations

LEGISLATION would not be introduced to increase the borrowing powers for capital expenditure of the electricity supply industry in view of the nuclear power programme, Mr L. W. Joynson-Hicks said last week. Mr T. W. Jones suggested this because of the need for rapid expansion of the electrification programme. He was told that the B.E.A. had at present unused borrowing powers of about £675m and that would accommodate all possible capital expenditure on nuclear power stations within the next few years.

Scottish Electricity

THE Secretary of State for Scotland was asked by Mr A Palmer when the regulations dealing with compensation to officers, required under Section 12 of the Electricity Reorganisation (Scotland) Act, would be laid before Parliament. The regulations were being considered, he was told, but no date could be given yet.

Hydro Electricity in Scotland

FACTS about hydro power in the North of Scotland were given by the Secretary of State for Scotland in reply to a series of questions from Mr G. Nabarro. The Minister stated that the average cost per kW installed of all the Boards' hydro-electric schemes completed since 1945 was £114. Average cost of schemes under construction was estimated at £126. Rises in costs before completion would increase the latter figure. Cost per kW installed of new steam stations exceeding 50,000 kW commissioned since 1950 was about £60. On the question of output, the Minister said the aggregate output for last year from hydro-electric, steam and diesel was 1,556 million units. Of this total 1,566 million units were used within the area and the remainder of Scotland. Average load factor achieved by water power establishments in 1954 was 32%. From output to demand, and in

this connection Mr Nabarro was told that last year maximum demand in the Area was 314,000 kW. It was expected that demand would be three times as much by 1956. The figure was double that of 1947.

Monopolies Commission

EXPLAINING the existing establishment of the Monopolies Commission, Mr P. Thorneycroft said it now consisted of 16 members of which only the chairman was full-time. Three members devoted a considerable part of their time to the work and the remainder were ordinary part-time members. Since July, 1953, he said, ten members, including the chairman, had been appointed. There were no deputy chairmen. He also told Mr H. Wilson that 36 officers from Government Departments had been seconded for duty with the Commission compared with 27 on 1 July, 1953. Sixteen were at present employed in an administrative or specialist capacity.

Merchandise Marks Prosecutions

EXPLAINING the functions of the Board of Trade as regards prosecutions under the Merchandise Marks Act, Mr P. Thorneycroft said he had no statutory responsibility for determining the worth of particular mechandise. The Prosecutions Branch investigated complaints of alleged offences against the Acts, and proceedings were instituted where they were warranted. Miss E. Burton had asked whether the B.o.T. would investigate a case if a customer bought goods which were worthless and the shop refused to do anything about it. She indicated that she intended to raise the matter on the Adjournment.

Science Students

THE Minister of Education was asked by Mr C. I. Orr-Ewing what were the numbers of science and technology students in the U.K. per 1,000 of the population. Sir David said for full-time students in universities and technical colleges the proportion was about 1·1. This proportion did not include part-time students.

Sayings OF THE WEEK

"I think all our efforts should be concentrated on eliminating solid fuel as a heating medium (in homes) as soon as possible . . ." ALD. J. R. BALMER, Lord Mayor of Birmingham, at the luncheon of the Midland Region, Coal Utilisation Council.

"Teaching science to boys is hard work—one has to dispel the romance of space ships and interplanetary travel and get down to the more restricted activity of the laboratory . . ." MR J. ECCLES, at the I.E.E. annual dinner.

"The Gas industry is fighting for its life. The entry of nuclear energy made it clear that in 10 years' time it would be up against other difficulties . . ." MR J. MCFADYEN, at the Eastern Gas Consultative Council meeting.

ELECTRIC SUPPLY NEWS

Bridlington

Earlier complaints of low voltage and insufficient power made by members of the Rural Council, were answered by officials of the Yorkshire Electricity Board at a recent Council meeting. It was explained that the demand for power in the Bridlington rural area was increasing annually by 10%. But by 1957 there would be sufficient electricity mains to provide the means of giving every farm in the area a supply. At the moment the main supply into Bridlington was through Scarborough, but by the winter of 1956/57 the reinforced supply from the Hull direction, through Driffield, would be in commission. Present troubles were confined to small periods in village systems, probably at the remote ends of distribution lines. The Council was informed that plans for a better supply to Flamborough and Hunmanby, about which complaints had been made, would be completed before or during the summer. At the last meeting complaints were made that 18 bungalows were being supplied by overhead cables. Members were told that the overhead cables would now be rerouted at the rear of the bungalows.

Hereford

Following the change over to a.c. the Midland Electricity Board last week closed down the Hereford power station from which d.c. has been supplied since 1899. The last d.c. consumer was the printing plant of a Hereford newspaper. At a little ceremony, Mr W. S. Lewis chairman of the Board, opened for the last time the switches controlling the d.c. conversion plant, and brought the machinery to a standstill. The station is being converted for use as a workshop, stores and garage for the Board. Mr Lewis said that the change over of the system from d.c. to a.c. began before the war, and when work was interrupted the centre and most densely loaded area was still on d.c. Shortly after the M.E.B. was established in 1948, the work of laying new cables and commissioning new substations for supplying a.c. in the central part of Hereford was put in hand. In 1950 there remained 230 consumers on d.c., taking nearly 720,000 units annually between them. Most of these were changed over by last May. It had involved laying nearly 2,400 yd of new cable in the city at a cost of upwards of £25,000. In addition the Board had been spending £60,000 a year over the past few years on schemes for the reinforcement of the distribution system in the area. Consumers in the Hereford district, which covers an area of 470 sq miles, have increased from 14,000 in 1948 to nearly 22,000 today. Unit sales in the district, which were about 55 millions in 1952 and 61 millions in 1953, were now running at the rate of over 70 millions annually. The Board was spending over £6 millions annually on development throughout its area. There were still about 17,000 consumers on d.c. in the whole area, and it was expected that it would cost about £2 millions to complete the change over.

High Marnham

The B.E.A. has ordered its first 200 MW turbo-generator from the English Electric Co. Ltd., and International Combustion Ltd., are to supply the associated pulverised fuel fired boiler plant. The turbo-generator and boiler—the largest to be built in this country—are the first of five generators and boilers which will be installed in a new power station to be built on the River Trent. Subject to consent of the Minister of Fuel and Power, it will be erected on a site provisionally selected at High Marnham. It is to have an ultimate capacity of 1,000 MW. Each boiler, operating at a pressure of 2,450 lb/sq in. and 1,060° F, with reheat to 1,005° F, will have an output of 1,400 klb/hr.

S.W. Scotland

The South West Scotland Electricity Board have approved a scheme for the reinforcement of the network in north-east Glasgow. New 132/33 kV transformers will be installed at Port Dundas substation from which duplicate 33 kV feeders will be laid to substations in Springburn and Petershill Road, thus transferring this district from its present source of supply, Dalmarnock power station. The cost is estimated at £232,000. The Board is also to reinforce the network between Girvan and Pinwherry by the erection of 8 miles of 3-phase, 33 kV o.h. line, at an estimated cost of £30,000. A £113,764 scheme for reinforcement of h.v. networks to the west and south of Paisley, has been approved, along with a £15,000 scheme for the second stage of the changeover from 3·3 kV to 11 kV working of the Beith network, and a plan to provide an alternative supply to Skelmorlie, estimated to cost £11,550.

LIGHTING SCHEMES

Buxton. Plans are now being made for phase three of the borough's street lighting electrification scheme.

Crawley. The Parish Council is to spend £1,750 on fluorescent lighting along part of the Brighton Road.

Litherland. It is proposed to apply for loan sanction for £15,500 to cover the cost of converting nearly all street lighting from gas to electricity.

Mitcham. The Council is applying for sanction to borrow £30,500 to complete the re-lighting of the main roads.

Ripon. T.C. is recommended to approve in principle a scheme for conversion of street lighting to electricity.

Shipley. It is proposed to convert all street lighting to electricity within the next ten years.

COMPANY ACTIVITIES

WHAT a week it has been—a week to test the hardest-bitten speculator. When the Bank Rate was raised from 3½% to 4½% the City saw its biggest ever fall in stocks and shares in one day. Some of the staid gilt-edged securities dropped nearly 5 points. But Mr Butler's drastic move quickly brought results. There was an immediate recovery in the international value of the £ and gilt-edged securities recovered about half their losses next day.

Electrical securities varied. Those tightly connected with H.P. suffered worse but the bigger groups with diverse interests were steadier. Here is a mixed list, showing the peak prices for 1954/55, prices on Feb. 24 when the Bank Rate was increased, and prices the following day.

	1954/55 High	Feb. 24	Feb. 25
Associated Electric	73/9d.	63/-	63/-
Decca	68/-	46/-	49/3d.
Crompton Parkinson	19/3d.	16/6d.	16/3d.
English Electric	68/9d.	61/6d.	62/9d.
General Electric	61/9d.	52/-	53/9d.
E.M.I.	36/9d.	29/6d.	30/-

One of the first casualties of the changed market conditions was the issue to stockholders by the General Electric Co. of £6 million 4% Unsecured Loan 1975/80 at £97½%. Underwriters had to take up 92½% of their participations on the day Bank Rate was changed, and on Friday the stock went to a discount of 5½ before recovering to 4 discount. Another casualty was Electrical and Musical Industries. Dealings started on Thursday in the 5½% £1 second preference shares, 10s. paid, on the basis of 9s. 3d. and closed 8s. 4½d. The 4½% Loan stock, £25 paid, fell to £21/£24. As it is unlikely that Mr Butler will keep the Bank Rate at 4½% any longer than he can help, any of these issues look cheap.

Despite the magnificent results, Hoover's shares were knocked for six on the H.P. restrictions. But this will not last. Last year's results with 6 months' unrestricted H.P. gave a 48% rise in group profits from £3·1 millions to £4·6 millions, before tax. Dividend went up from 45% to 70%. Not all the Hoover business is H.P. In the background there is a substantial section in fractional horse power motors which have a wide application in industry. And the group has a magnificent overseas business.

Morphy Richards Ltd. are doing exceedingly well. Sales for the first seven months of the current financial year show a substantial increase over last year and the net profits to date appear to the board to justify an increased interim dividend. Shareholders are to get 20% on a capital increased by a 50% bonus. This is equal to 30% interim on the old capital as compared with 15% actually paid last year. The company's big export trade is a good insurance against any set-back in H.P. sales.—*From our City Correspondent.*

Associated Electrical Industries

The group net trading profit for 1954, after taxation etc., is £4,512,000 compared with £2,933,000 a year earlier. The final dividend is 10%, making 14% for the year.

Thomas Bolton and Sons

This copper smelting and refining concern, which is controlled by British Insulated Callender's Cables Ltd., reports a trading profit of £354,635 for last year, compared with £381,819 for the previous twelve months. After taxation, etc., the net profit figures are £60,841 and £245,138 respectively. The dividend is reduced by 2½% to 10%, the final being 7½%.

Bruce Peebles and Co. Ltd.

Profit after taxation, for the year ended 31 Dec. last is £231,852 compared with £164,307 for the previous period. There is again a dividend of 15% plus a bonus of 10%, but on doubled capital.

Clarke, Chapman and Co. Ltd.

After charging taxation of £231,362 (*£163,308*), the net profit for 1954 is £395,212, compared with £275,763 for the previous twelve months. The dividend is again 20%.

Electric and Musical Industries Ltd.

Underwriters of the offer to stockholders and noteholders of £2 millions of 4½% Unsecured Loan stock, and 3 millions 5½% £1 Cumulative Second Preference shares, have been called upon to take up 89% and 84¼% respectively of their participations.

Electrical and Industrial Investment Ltd.

For 1954, the net profit, after taxation, is £59,363 (*£56,133*). The Deferred Ordinary dividend is 80% (*60%*).

Engineering and Lighting Equipment Co.

It is proposed to make a three-for-two scrip issue.

English Electric Co. Ltd.

Following the offer to acquire the business of Vulcan Foundry and Robert Stephenson and Hawthorns, the directors recommend, in view of the potential development in the many fields in which the company is engaged, that the authorised capital of the company should be increased to £25 millions by the creation of a further 10 million Ordinary £1 shares. This proposal will be considered at a meeting on 17 Mar. The full accounts show current assets listed at £60·6 millions, of which stock and work-in-progress accounts for £52·8 millions.

Year to 31 Dec	£ Trading Profit	£ Net Profit†	% on Ord. Earned	% on Ord. Paid	Ord. Price High	Ord. Price Low
1950	4,085,342	1,099,892	45	15	48/10	38/6
1951	4,762,088	1,300,475	57	15	74/3	47/3
1952	5,948,403	1,543,725	53	15	59/3	50/3
1953	6,489,863	1,546,995	27	11⅔‡	40/8	34/-
1954*	7,289,334	2,098,609	39	12½	58/9	38/-

*52 weeks ending 25 Dec.
†Available for parent Co.
‡Plus 50% capital bonus.

General Electric Co. Ltd.

The underwriters of the issue to stockbrokers of the £6 million 4% Unsecured Loan stock 1975-80 at 97½% have been called upon to take up 92½% of their participation.

Hoover Ltd.

A further record group profit has been achieved for 1954. The figure is £4,581,961 compared with £3,095,793 a year ago. The dividend too, is raised by 25% to 70%, the final being 60%. After providing all charges, including a taxation provision of £2,050.229 (*£1,584,828*), the net profit amounts to £2,350,208—over £1 million more than a year ago.

Marconi International Marine Communication Co.

It is proposed to raise the authorised capital from £1½ millions to £2½ millions, by the creation of 1 million Ordinary £1 shares.

Midland Electric Manufacturing Co.

The net profit for 1954 is £203,392, as against £145,088 for the previous year. That figure is struck after charging taxation of £206,500 (*£198,000*). The dividend is 10% on capital increased by a 100% scrip bonus.

Peter Brotherhood Ltd.

The Capital Issues Committee has consented to the one-for-one scrip issue. Their proposal, which calls for the capitalisation of £350,000 of reserves, is to be considered at a meeting on 15 Mar.

Taylor Tunnicliff and Co.

Group profit, etc., for 1954 is £369,972 (*£316,863*), and the net profit is £162,809 (*£146,636*). The dividend is raised by 2½% to 15%.

Waygood-Otis Ltd.

For 1954, the profit of this firm of lift and escalator manufacturers is £448,610 (*£585,727*). The final dividend is raised by 10% to 35%, making a total distribution of 75% (*65%*) for the year.

Dividends Declared

Lightfoot Refrigeration. Interim 3% (*same*).

Mexican Light and Power Co. Dividend of 37½ cents, plus 1/20th of a Common share.

Morphy-Richards. Interim 20% (*15%*) on capital increased by 50% scrip issue.

Ransome and Marles Bearing Co. Interim 5% (7½%) on increased capital.

COMMERCIAL INFORMATION

Contracts Open at Home . . .

Dates given are the final for receipt of tenders unless otherwise stated.

4 Mar.—Blackburn. Lamps in year from 1 Apr.—See 10 Feb. issue.

4 Mar.—Chatteris (Isle of Ely) U.D.C. Concrete and steel lighting columns, conversion from gas to electricity, and equipment for mercury vapour and tungsten lighting.—See 3 Feb. issue.

4 Mar.—Cheshire. Lamps in year from 1 Apr.—See 24 Feb. issue.

5 Mar.—Longbenton U.D.C. Installation in 30 houses at Forest Hall.—See 17 Feb. issue.

5 Mar.—Co. Mayo. Sewage pumping plant in Kiltimagh sewerage scheme.—See 20 Jan. issue.

5 Mar.—New Mills T.C. Group A street lighting on trunk road A.6.—See 24 Feb. issue.

5 Mar.—Stourbridge T.C. Installation of class A and B street lighting and concrete columns.—See 24 Feb. issue.

7 Mar.—Andover T.C. Concrete columns and equipment for sodium vapour discharge and fluorescent lighting.—See 17 Feb. issue.

7 Mar.—Buxton T.C. Group A mercury units on steel columns along A.6.—Advertised in 10 Feb. issue.

7 Mar.—N. Ireland. Electrical materials in year from 1 Apr.—See 24 Feb. issue.

7 Mar.—Stepney B.C. Installation in blocks of flats in Sidney St.—Advertised in 3 Feb. issue.

7 Mar.—Stockport. Lamps for Hospital Committee.—See 24 Feb. issue.

7 Mar.—Stretford T.C. Installation in 36 flats in Edge Lane.—See 24 Feb. issue.

8 Mar.—N. Ireland. Electrical supplies and lamps in year from 1 Apr. for St. Luke's Hospital.—See 17 Feb. issue.

8 Mar.—Swanage U.D.C. Sodium lamps on concrete columns for groups A and B lighting.—See 10 Feb. issue.

9 Mar.—Dublin. Installation at Grangegorman Mental Hospital.—See 17 Feb. issue.

9 Mar.—Lanarkshire. Electrical installation in R.C. primary school at Uddingston. Apply by above date to W. C. Brownlie, county clerk, Lanarkshire Hse, 191 Ingram St, Glasgow.

9 Mar.—N. Ireland. Lamps fittings and maintenance work in year from 1 Apr., at four Hospitals.—See 17 Feb. issue.

9 Mar.—N. Ireland. Repairs at three hospitals in year from 1 Apr.—See 24 Feb. issue.

10 Mar.—Chadderton U.D.C. Lamps and street lighting columns in year from 1 Apr.—See 24 Feb. issue.

10 Mar.—Cheadle and Gatley U.D.C. Lamps, lanterns, swan neck brackets, switching-gear brackets, in year from 1 Apr.—See 24 Feb. issue.

10 Mar.—East Suffolk. Supply of heavy canteen equipment. Chief Education Officer, Rope Walk, Ipswich.

11 Mar.—Belfast T.C. 14 in. bore parallel slide valve for steam plant and bomb calorimeter.—Advertised in 17 Feb. issue.

11 Mar.—Dublin T.C. Supply of 10,000 yd P.B.J. cable.—See 24 Feb. issue.

11 Mar.—Southport T.C. Installation at the Lido, Promenade, Ainsdale.—See 17 Feb. issue.

12 Mar.—Airdrie T.C. Lamps in year from 16 May.—See 3 Feb. issue.

12 Mar.—Barrow. Lamps and maintenance of refrigerators.—See 24 Feb. issue.

12 Mar.—Beccles T.C. Lamps and electrical materials and services in year from 1 Apr.—See 24 Feb. issue.

12 Mar.—Ennerdale (Cumb.) R.D.C. Wiring of 22 houses at Cleator Moor. Surveyor, Council Offices, Cleator.

12 Mar.—Peterborough T.C. Supply of 26 steel columns with erection and wiring and fitting of electrical equipment, and/or supply of electrical equipment and lanterns. L. H. Robjohn, City Engineer and Surveyor, P.O. Box 10, Town Hall. Deposit £2. 2s.

12 Mar.—Walsall T.C. Rewiring at Bloxwith Baths. Baths Superintendent, Corporation Baths Dept., Tower St. Deposit £2. 2s.

14 Mar.—Cardiff T.C. Installation in Llanrumney school for girls.—See 17 Feb. issue.

14 Mar.—Cheltenham T.C. Concrete columns, sodium discharge lamps lanterns, etc., for London-Fishguard Rd.—Advertised in 17 Feb. issue.

14 Mar.—Grimsby. Installation in old people's home in Littlecoats Rd.—See 17 Feb. issue.

15 Mar.—N. Ireland. Electrical installation at Kesh county intermediate school. Consulting engineer, W. J. Ogle, 63 Main St, Bangor. Deposit £2. 2s.

16 Mar.—Scunthorpe T.C. Steel columns, fluorescent lanterns, etc.—Advertised in 24 Feb. issue.

16 Mar.—Scunthorpe T.C. Concrete columns, mercury discharge lanterns for Manor Farm estate.—Advertised in 24 Feb. issue.

16 Mar.—Stoke-on-Trent T.C. Concrete columns with lanterns and accessories for mercury discharge lighting along main roads.—See 24 Feb. issue.

16 Mar.—Sunderland T.C. Electrical installation at Villette Rd school clinic. Borough Architect, Grange Hse, Stockton Rd. Deposit £2. 2s.

19 Mar.—Worsley U.D.C. Supply, erection of class A concrete columns, electrical gear, lamps and lanterns for 140 W sodium lighting. L. T. Broome, Engineer and Surveyor, Town Hall, Walkden. Deposit £2. 2s.

21 Mar.—Manchester T.C. Electrical installation in 18 old people's dwellings (contract 221) at Middleton. Director of Housing, Town Hall.—Advertised in this issue.

21 Mar.—Wigan T.C. Supply of various street lighting equipment for various group A and B schemes. Borough Engineer, Municipal Buildings, Library St.

23 Mar.—Clutton (Bristol) R.D.C. Electrical installation in 50 houses at Timsbury. Architects, Thomas and Morgan and Partners, 23 Gelliwastad Rd, Pontypridd. Deposit £1. 1s.

25 Mar.—Manchester T.C. Various types of service cables and telephone cable at Haweswater Works, Westmorland.—Advertised in 24 Feb. issue.

30 Mar.—Warrington T.C. Rewiring at Central Police Station in Arpley St. Borough Surveyor, Town Hall.

31 Mar.—Belfast T.C. Central evaporating plant.—Advertised in 27 Jan. issue.

31 Mar.—Inverness. Electrical work in erection of primary school at Hilton. J. Shankley, chart. quantity surveyor, 2 Ness Walk.

2 Apr.—Cheadle and Gatley U.D.C. Supply and erection of 30 Group A concrete columns with 140 W sodium lamps and lanterns in Wilmslow Rd. Engineer and Surveyor, Town Hall, Bruntwood, Cheadle. Deposit £2. 2s.

6 Apr.—Wandsworth B.C. Concrete columns and ancillary gear for groups A and B street lighting.—Advertised in 10 Feb. issue.

6 Apr.—Wandsworth B.C. Sodium discharge lamps and jackets for route J.—Advertised in 24 Feb. issue.

7 Apr.—Belfast T.C. 3,300 V and 400 V switchgear and accessories. Also (closing date **24 Mar.**) extensions of coal handling plant.—Advertised in 10 Feb. issue.

18 May—Dublin T.C. Electrically-driven

Your Queries Answered

Readers are invited to make use of our free enquiry department which possesses wide resources including an index of trade information with over 100,000 entries

A Selection from the 119 queries answered this week

"Flame Electric" fires, makers of? T.B.—Artic Fuse and Electrical Mfg. Co., Ltd., Birtley, Co. Durham.

"Casson" drying cabinets, makers of? H. and E.—Casson Electric Co., Ltd., 5 New Brown St, Manchester 4.

"Itonia" irons, makers of? W.P.—The makers of this iron Itonia Ltd., went out of business in 1949. Mr H. Chapman, 71 Goldsworth Rd, Woking, Surrey, can undertake repairs.

Spin or tumbler drvers—domestic size, suppliers of? W.J.C.—English Electric Co., Ltd., Queens Hse, Kingsway, W.C.2; Pollard Ray and Sampson Ltd., 235 Imperial Drive, Harrow; G. L. Murphy Ltd., Imperial Works, Menston nr. Leeds; Neil and Spencer Ltd., Station Rd, Leatherhead; Aircraft and General Eng. Co., Ltd., Cedardale Works, Luton Rd, Harpenden, Herts. There is also the "Bendix" and "Thor" washing machines which provide a similar service.

"Metwood" lighting fittings, makers of? Metwood Accessories, 65 Church St, Wolverton, Bucks.

Induction headphones without trailing wires, makers of? D.E.—Magnetic Broadcasting Co., Ltd., 1 Upper Richmond Rd, S.W.15.

sewage pumps for Clontarf station.—See 24 Feb. issue.

No date stated.—N. of Scotland H.E. Board. Erection of about 118 miles o.h. lines in Grudie Bridge/Kyle of Lochalsh reinforcement.—Advertised in 24 Feb. issue.

No date stated—Garforth U.D.C. Electrical work and supply of lamps in houses to be built in year from 1 Apr. G. N. Smith, Engineer and Surveyor, Council Offices.

No date stated—Wednesbury T.C. Electrical installation in 40 bungalows on Millfields estate. Borough Engineer and Surveyor, C. G. Morrish, Town Hall.

. . . and Overseas

*Details of items marked * may be obtained on application to the Board of Trade, Lacon House, Theobalds Rd, W.C.1, quoting reference.*

15 Mar.—India. Govt. of Andhra's. Electricity Dept., requires supply of various distribution transformers. Specif. No. A.168. Superintending Engineer, Technical (Electrical), 20 Rutland Gate, Nungambakkam, Madras. B.o.T. (Ref.: ESB 4189/55).*

15 Mar.—S. Rhodesia. Supply of 33 kV and lower voltage cables and accessories for power station No. 3. City Electrical Engineer, P.O. Box 73, Wynne St, Salisbury, or Merz and McLellan, Carliol Hse, Newcastle-on-Tyne.

18 Mar.—New Zealand. Supply of 30,000 yd of VIR triple-braided hard-drawn cable of 0·1 sq in. section. Cable is for 6,600 V a.c. overhead lines. Auckland Electric Power Board, Queen St, Auckland. B.o.T. (Ref.: ESB 4220/55).*

22 Mar.—India. Supply of 3,000 kVA, 2,000 kVA and 1,000 kVA 66/33 kV transformers. Specification No. Project-1. Madhya Pradesh Electricity Board, New Castle Building, Seminary Hills, Nagpur. B.o.T. (Ref.: ESB 3127/55).*

24 Mar.—India. Supply of line and pedestal insulators for 140 miles of double circuit and 208 miles of single circuit 132 kV transmission lines and five 132 kV outdoor substations. Specif. no. E.D. 074-1. Electrical Dept. of Damodar Valley Corpn., Anderson Hse, Alipore, Calcutta 27. B.o.T. (Ref.: ESB 3126/55).*

30 Mar.—New Zealand. Supply of 3,415 capacitors and 1,370 clamps of various types for Stores Division of Post and Telegraph Dept., Windsor Building, Willis St, Wellington. Tender No. P. and T. 157/238. B.o.T. (Ref.: ESB 3421/55).*

31 Mar.—Australia. Hydro-Electric Commission of Tasmania, Box No. 631, B, G.P.O., Hobart, invite tenders (Specification No. C.E.489) for supply of electrically driven pumping plant for Tarraleah power development No. 2 Canal. Documents available from Agent General for Tasmania, 457 Strand, London, W.C.2.

31 Mar.—Australia. Tenders (contract 1858) invited for 12 two element astatic dynamometers, roll chart type recording ammeters with range of 0·5 amps, with accessories (chart time markings ¼ in per hr.). Sydney County Council, Queen Victoria Building, George St.

31 Mar.—Belgian Congo. Supply, installation of low intensity luminous ground lighting equipment at Luluabourg aerodrome, costing about B.Frs. 4·4m. Service des Approvisionnements du Ministere des Colonies, 1 rue de la Regence, Brussels. B.o.T. (Ref.: ESB 2860/55).*

PRICES of cable metals and other materials

Figures quoted are the official prices ruling on Tuesday, 1 March

	£ per ton	Weekly change £	Price last year £
COPPER, standard class A (settlement)	342½	+9½	235
,, (3 months)	332	+14½	221
LEAD, refined pig, min. 99·97% purity (cash)	103½	+⅝	83
,, (3 months)	102½	+⅝	82½
TIN, refined, min. 99·75% purity (settlement)	713	+6½	690
,, (3 months)	717½	+7½	665
ALUMINIUM, ingots 99·99·5%	163	—	156
ZINC, virgin, min. 98% purity (cash)	86½	−1	72½
,, (3 months)	86½	—	71½
RUBBER No. 1, RSS, spot (per lb.)	26⅜d.	−1⅛d.	16½d.
,, c.i.f. basis, ports, May (per lb.)	26¼d.	−1⅛d.	16½d.
ARMOURING:			
Galv. Steel Wire (0·104 in.)	52⅝	—	52
Mild Steel Tape (0·014 in.)	41⅛	—	40

31 Mar.—India. Supply of 200 AH battery blank, generating sets, battery charging panels, d.c. distribution boards, auxiliary power transformers, dry type unit auxiliary transformers with associated 11 kV and 3·3 kV switch gear, l.t. a.c. switchboard and auxiliary supply control panel, for Maithon hydro-electric power station. Tender No. Ed.780-1. Damodar Valley Corpn., Anderson Hse, Alipore, Calcutta. B.o.T. (Ref.: ESB 3995/55).*

10 Apr.—India. Director-General of Supplies and Disposals, Shahjahan Rd, New Delhi, requires electrical equipment for external electrification of Bharat Electronic factory at Jalahali, including 11 kV and 66 kV switchgear and control panels, l.t. switchgear, double ratio transformers and cables. Tender no. Project/SE2/25058/F. Documents from above at Rs. 20.

12 Apr.—Egypt. Erection, testing, etc., of indoor step-down transformer and switching station called Iron and Steel Works substation. Cairo Electricity and Gas Administration, 53 Avenue 23, Juillet, Cairo. (B.o.T. (Ref.: ESB 2867/55).*

14 Apr.—Uruguay. Supply of 200 electric petrol pumps for single-phase a.c. 220 V 50 c/s supply. Specif. no. 2566. Administracion Nacional de Combustibles Alcohol y Portland, Casilla de Correa 1090, Montevideo. B.o.T. (Ref.: ESB 3150/55).*

15 Apr.—Philippines. National Power Corporation, Manila, require two hydraulic turbines, two governors, and two inlet valves, and/or two generators, a power transformer, complete switchgear for Agusan River Hydro-Electric project. B.o.T. (Ref.: ESB 3461/55).*

19 Apr.—New Zealand. Tenders, P and T 150/7715, invited for two stable variable frequency oscillator units, by Director General, Stores Div., G.P.O., 49 Willis St, Wellington. B.o.T. (Ref.: ESB 3136/55).*

25 Apr.—Kuwait. Supply, erection of four 1,500 kVA 34·6/11 kV, two 10,000 kVA, 33/11 kV, and four 15,000 kVA 33/11·5 kV transformers for Power Station B. President, Dept. of Electricity, Govt. of Kuwait, Kuwait.—Advertised in 24 Feb. issue.

4 May.—Australia. Supply of one internal combustion engine driven generating plant for Blackhall Shire Council. Continuous rated output of about 150 kW, alternatively 190 kW, with engine operating as gas engine. Specification No. 489. State Electricity Commission of Queensland, Scottish Union Hse, Eagle St, Brisbane. B.o.T. (Ref.: ESB 3627/55).*

Contracts Placed

Cheltenham. Lighting services at Lansdown station for British Railways. Stallard and Co.

Cockermouth (Cumb) U.D.C. Provision of lighting in various streets in the town, General Electric Co., Ltd., £3,644.

Durham. Installation at former Johnston school, South St, N. of England Engineering Co., Ltd., £3,694.

Durham R.D.C. Electrical fittings for housing scheme. Z. Electric Co., Ltd., £1,161.

Edmonton (Middx.) T.C. Improved street lighting in Bouncers Rd, Eastern Electricity Board, £1,227.

Frome U.D.C. Street lighting installation and extension, Siemens Electric Lamps and Supplies Ltd., £4,504.

Higham Ferrers T.C. Street lighting installation along A.6 trunk road, Metropolitan-Vickers Electrical Co., Ltd., £2,656.

Llanelly. Lighting and heating facilities at Motive Power Depot for British Railways, Read and Partners Ltd.

Marlborough T.C. Concrete columns and lanterns, etc., for trunk road lighting scheme, Concrete Utilities Ltd., £4,290.

Metropolitan Water Board. Lighting and power installation at Barn Elms works, Murray, Munro and Co., Ltd., £1,389; installation at garages and workshops at Lee Bridge Works, W. J. Furse and Co. (London) Ltd., £1,100; cables, wiring and switchgear for Chingford South pumping station, George E. Taylor and Co. (London) Ltd., £3,439.

Middlesbrough T.C. Installation in old people's hotel at Thorntree, Horne and Co., Ltd., £2,589.

Newcastle-on-Tyne. Automatic telephone system at blood transfusion centre of General Hospital, Automatic Telephone and Electric Co., Ltd., £4,213.

Newcastle-on-Tyne. Three 5-ton electric cranes at Albert Edward Dock for Tyne Improvement Commission, Cowans Sheldon and Co., Ltd. Also, installation at Fleming Children's Hospital, G. B. Carnegie and Co., £1,049.

Smethwick T.C. Installation in 11-storey block and radio and TV wiring for both 4- and 11-storey blocks on redevelopment site No. 1, Midlands Electricity Board.

BUSINESS PROSPECTS

Home

Ashton-under-Lyne T.C. Approval received for erection of 136 flats at Charlestown and 32 houses in Neal Ave.

Barnes T.C. Construction of 22 flats in two blocks in High St and Grove Rd. Borough Engineer and Surveyor, Municipal offices, Sheen Lane, S.W.14.

Barnsley T.C. Construction of 100 houses on Athersley North estate and 78 on Hunningley Lane estate. Borough Engineer, Town Hall.

Berkhamsted U.D.C. Erection of 44 flats in four blocks. R. E. Hulse, Engineer and Surveyor, Civic Centre.

Billingham-on-Tees. Newcastle Breweries Ltd. planning new hotel in The Causeway. It will comprise 14 bedrooms, dining hall and banqueting hall, and will cost about £170,000. Architect is E. M. Lawson, Barras Bldg, Barras Bridge, Newcastle.

Birmingham. University to begin work on first stage in erection of large library at Edgbaston. Verner O. Rees, 51 Queen Caroline St, London, W.6, is architect, and cost is estimated at £427,000.

Blackburn T.C. Construction of 15 shops and flats on Higher Croft site and 4 shops and flats on Green Lane site. Borough Engineer, Town Hall.

Bradford T.C. Tenders may soon be invited for electrical equipment at Conditioning Hse. Cost estimated at £1,950.

Bullingdon (Oxon) R.D.C. Hundred houses to be built this year to rehouse families in hutted camps.

Carlisle T.C. Erection of Pennine Way junior school. City Surveyor, 18 Fisher St.

Chester-le-Street R.D.C. It is proposed to build 337 houses at Barley Mow.

Coalville (Leic) R.D.C. It is proposed to erect 90 houses and eight flats on Station Rd site, Donisthorpe.

Dundee. Mental Hospital, Westgreen, to be reconstructed by Eastern Hospital Board during 1955-56 at cost of about £250,000.

Epsom and Ewell (Sur) T.C. Plans approved for erection of 74 maisonnettes on land between Gatley and Amis Aves, Ewell.

Flint. Office block at their Castle works is to be extended by Courtaulds Ltd.

Glasgow. Large extensions to carpet factory in Templeton St proposed by Joseph Templeton and Co., Ltd., Bridgeton.

Great Yarmouth. D. and F. McCarthy Ltd., 38 Market Place, negotiating for land for erection of canning factory.

Halifax T.C. Application to be made to borrow £11,750 for renewal and improvement of electrical installation in eight schools.

Hendon T.C. Scheme proposed for lighting improvements at Orange Hill boys' and girls' schools during 1955-56 at estimated cost of £1,000.

Holborn. Tenders to be invited in about 3 months for erection of shops, offices, boys' and girls' clubs in Lamb's Conduit St, for Harper St, Bedford. Architects are Lander, Bedells and Crompton, 36 Lamb's Conduit St, W.C.1. Estimated cost £66,000.

N. Ireland. Construction of 208 dwellings and shop at Branill, Gilnahirk, N.I. Housing Trust, 12 Hope St, Belfast.

Liverpool T.C. Construction of West Derby secondary technical school. City Architect, Blackburn Chambers, Dale St.

Lewes (Sus). Scheme proposed for enlarging Lewes grammar school for girls. It is estimated to cost £56,000.

Londonderry T.C. Approval sought for erection of 90 dwellings in Glendermott Rd.

Maldon (Essex). Plans approved for erection of new factory at Tolleshunt Major for Goldhanger Fruit Farms Ltd.

Middlesbrough. Work expected to start next year on new £200,000 police H.Q. in Grange Rd. Preliminary sketch plans approved.

North Riding. Sketch plans approved for primary school at Colburn, for which architects are S. Morrison and Partners, Full St. Derby. Extensions to Guisborough grammar school costing £16,000 are planned.

Northumberland. £3,000 to be spent this year on installing electricity in total of 12 schools.

Nottinghamshire. Completion of "T" extension to County Hall has been approved. Cost estimated at £996,000.

Poole. Branksome Ceramics Ltd., 125 Syrren Rd, Westbourne, propose to build new factory on their old site.

Ramsgate T.C. Plans approved for 169 houses in next financial year.

Seaton Valley U.D.C. Sanction to borrow £36,809 being sought for erection of 30 houses on Village Rd estate, Cramlington.

Stockport T.C. Tenders may be invited soon for second stage of electrical installation at town hall.

Stoke-on-Trent T.C. Application to be made to borrow £249,000 for erection of engineering and metallurgical dept. at N. Staffs Technical College.

Sutton Coldfield. Workshops, offices proposed on industrial site at Reddicap Hill by both Johnson Veterinary Products, 26 Bagnall St, West Bromwich, and Crossley Bros. Ltd., 101 Sladefield Rd.

Swindon. Pressed Steel Co., Ltd., to build large motor body factory at Stratton St. Margaret.

Swinton and Pendlebury T.C. Erection of block of 13 shops with maisonnettes at Clifton. Borough Engineer and Surveyor, Town Hall, Swinton.

West Bromwich T.C. Jensen Motors Ltd. proposing to build factory at Lyttleton Hall. A. E. H. Simms, R. C. Gifford and A. Bye, architects, 323 High St.

West Riding. Erection of multiple clinic at Horsefair, Pontefract. County Architect, Bishopgarth, Westfield Rd, Wakefield.

Worksop T.C. Erection of 110 houses and 16 flats on Kilton Hill estate and 50 bungalows on Valley Rd estate. Borough Engineer, Park Hse.

Overseas

Saudi Arabia. Saudi/Lebanes Industrial Co., Dammam, would like quotations from U.K. firms for electrical machinery, small ½ and 1 h.p. generators, domestic water pumps and welding rods, as well as various items for car maintenance and servicing.

Gazette Announcements

COMPANIES ACTS

Refrigeration Wholesale Supplies Ltd. Meeting of creditors took place on Tues. (1 Mar.).

Partnership Dissolved

Glamorgan Electrics. Partnership between John Cawson, and Thomas A. Thompson, trading at 6 Lansdowne Rd, and St Mellons Garage, Cardiff, dissolved as from 1 Feb. Debts received and paid by J. Cawson who will continue business.

Voluntary Liquidation

Chapman Bros. (Lamps) Ltd., Birmingham, 5. At statutory meeting of creditors, statement of affairs disclosed unsecured liabilities amounting to £6,874, of which £2,317 was due to trade and service creditors; £2,083 to loan creditors, and £2,472 to Bank. Assets of a balance sheet value of £2,435 estimated to realise £1,347, and after allowing £70 in respect of distrainable rent, there was balance of £1,276, which was insufficient to extent of £182 to meet preferential claims of £1,458. Deficiency, therefore, as regards creditors was £7,056. Issued share capital was shown at £1,000 and, so far as shareholders were concerned, deficiency totalled £8,056.

Creditors told that, in order that a dividend might become available to unsecured creditors, three of loan creditors for total of £1,499 were prepared to waive claims, and in addition, a director would pay £1,000 on his own account towards reduction of the Bank's preferential claim for £1,356. Mr W. L. Hand, acc., of Waterloo St, Birmingham, was appointed liquidator, with committee of inspection.

BANKRUPTCY ACTS

Applications for Discharge

Brighton. James W. Luker and Henry A. R. Phillips, trading as Gordon and Luker, electrical contractors, at 206 High St, and in East St, Lewes. Hearing fixed for 12 noon at the Court Hse, Church St, Brighton, on 16 Mar.

Canterbury. Frederick W. Bedingfield, electrical engineer trading at 49 High St, Folkestone. Hearing will be on 8 Mar. at 10.45 a.m. at the Sessions Hse, Longport, Canterbury.

Release of Trustee

Lincoln. John L. Parker, electrician of 15 West St, Horncastle. Trustee was E. C. Stimpson, Official Receiver, 22 Regent St, Park Row, Nottingham.

Intended Dividend

King's Lynn. Roy B. Goetze, electrical contractor trading at Old Market, Wisbech. Last day for receiving proofs, 14 Mar. Trustee is C. R. Taylor, Official Receiver, 41 Sidney St, Cambridge.

Bankruptcy

Richard William Hembrow, electrical engineer, Ealing, London, W.5. At public examination statement of affairs disclosed liabilities of £907 and no pet assets. Debtor said in 1946 he resumed pre-war occupation of jobbing electrical engineer. He experienced difficulty from shortage of capital and business was also affected by shortage of conduit piping during 1951 and 1952. He lost money because of retaining employees during slack periods. In 1953 the Inland Revenue obtained judgement against him for £55 arrears of schedule "D" tax. He attributed failure to drawing in excess of profits; losses on h.p. deals; legal costs; and bad debts.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, W.C.2.

G. D. Underwood Ltd. 1055 High Rd, Whetstone, N.20. Manufacturers of and dealers in electric lamps and accessories, etc. Nom. cap.: £5,000. Dirs.: G. D. Underwood and J. M. Underwood.

Grit Arresters Ltd. 82 King William St, E.C.4. Manufacturers of and dealers in machinery and equipment for the abatement of smoke and grit and air pollution generally, etc. Nom. cap.: £100. Dirs.: to be appointed by subs. Subs.: G. H. Baker and B. Carmichael, 82 King William St, E.C.4.

B and K Laboratories Ltd. 59 Union St, E.C.1. Distributors, manufacturers, representatives and agents for goods of all kinds, including instrumental, electronic, electrical, aeronautical and marine, mechanical, industrial and processing plant and equipment, etc. Nom. cap.: £1,000. Dirs.: C. B. H. Fentiman and D. H. McBean.

Variators Ltd. 2 Thames Hse, Queen St Place, E.C.4. Electro-mechanical engineers, manufacturers of and dealers in dynamos, motors, etc. Nom. cap.: £500. Dirs.: V. D. Boorman, D. H. T. Deaves and G. R. Ireland.

Venus and Spong Ltd. 37 The Street, Ashtead, Surrey. To take over business of electrical engineers and vendors of wireless and television sets and other electrical equipment carried on as "Venus and Spong," at Ashtead, Surrey. Nom. cap.: £3,000. Permt. dirs.: G. C. Venus and R. S. Spong.

Jerron Electric Ltd. 36 Osborne Rd, Acton, W.3. Manufacturers of and dealers in electrical and electronic fittings, etc. Nom. cap.: £100. Dirs.: J. I. Assersohn, R. H. Assersohn and P. E. Wilson.

C. T. Bingham Ltd. General, heating ventilating, lighting, mechanical and general engineers, etc. Nom. cap.: £500. Dirs.: C. T. Bingham and Peggy M. N. L. Bingham. Subs.: G. A. Crook, 51 Caversham Ave, Palmer's Green, N.13, Emily Faulkner, 15/17 Chichester Rents, Chancery Lane, W.C.2.

C. S. Bacon and Son (London) Ltd. 106 Village Rd, Enfield, Middlesex. Sanitary, electrical, gas, heating and ventilating and domestic engineers, builders, etc. Nom. cap.: £2,000. Dirs.: C. S. Bacon, Mrs. F. L. G. Bacon and C. R. Q. Bacon.

Heir Cresswell and Co., Ltd. 3/4 Berners St, W.1 Manufacturers of and dealers in electric motors, pumps, etc. Nom. cap.: £2,000. Dirs.: to be appointed by subs. Subs.: R. H. Heir and H. A. Cresswell.

Morgan and Co. (Cardiff) Ltd. 15 Dumfries Place, Cardiff. Electricians, electrical contractors and engineers, etc. Nom. cap.: £200. Dirs.: L. W. Morgan and R. J. O'Brien.

Remoco Electrical Appliances Ltd. 85 Camberwell Rd, S.E.5. Manufacturers of and dealers in electrical goods, etc. Nom. cap.: £100. Dirs.: J. J. Riordan and J. L. Concannon.

Ebor Electrical (Wholesale) Ltd. Queen's Straith, York. Nom. cap.: £5,000. Dirs.: W. L. Moss and R. G. Moss.

Trojan Electric Co., Ltd., 10/12 Alexandra Rd, Moss Side, Manchester, 16. To acquire such assets of The Trojan Electric Co., of Moss Side, Manchester, and Altrincham, as may be deemed expedient and carry on business of sellers of radio and wireless and television sets, etc. Nom. cap.: £25,000. Dirs.: H. G. Jenkinson, A. Mullock, and N. C. Sunderland.

Permanent Metals Ltd., Upalong, Carbis Bay, St. Ives, Cornwall. Sheet metal and plastic workers, mechanical, electrical, marine, motor, gas, water supply and general engineers, etc. Nom. cap.: £100. Dirs.: C. A. Boakes and Mrs A. A. Boakes.

A. Geall Ltd. To acquire all goodwill, plant and stock in trade of business of electrical engineers carried on at Hove as "A. Geall." Nom. cap.: £5,000. Permt. dirs.: C. C. Hyams, 15 Hogarth Rd, Hove 3; Mrs E. Hyams (address not stated); and C. R. Gerrard, 7 Grand Ave, Hassocks, Sussex.

David Jay Ltd. Manufacturers of and dealers in electrical goods, etc. Nom. cap.: £5,000. Dir.: D. Jay, 82 Anson Rd, N.W.2.

S. Barratt and Co. (Manchester) Ltd., 300 Ashton New Rd, Manchester. To enter into agreement for acquisition of business carried on by Stephen Barratt, electricians, mechanical engineers, etc. Nom. cap.: £1,500. Dirs.: S. Barratt and F. Nugent.

Sadler and Kinsey Ltd. 13b Hilton Lane, Prestwich, Lancs. Manufacturers of and dealers in electrical and mechanical apparatus and accessories, wireless and radio sets and valves, etc. Nom. cap.: £1,000. Dirs.: J. L. Sadler, S. Kinsey and J. Edwards.

South London Electrical Equipment Co., Ltd. 81 Lewisham High St, S.E.13. Nom. cap.: £3,500. Dir.: K. V. Slee.

"Lane" Magnetic Recorder Co., Ltd. 8 Black Lion St, Brighton. Manufacturers of and dealers in tape recorders, electronic instruments, etc. Nom. cap.: £1,000. Perm. dirs.: M. Lane, A. J. Lewis and G. Tack.

P. W. Baker and Sons (Sales) Ltd., 146 Windmill Rd, Sunbury-on-Thames, Mdx. Manufacturers of and dealers in domestic, industrial and engineering, controlling, indicating or recording apparatus for heating, lighting, etc. Nom. cap.: £100. Dirs.: J. E. Sherlock, C. Parker, and S. S. A. Sherlock.

Tricity Finance Corp. Ltd. 105 Judd St, W.C.1. Capitalists, financiers, etc. Nom. cap.: £50,000. Dirs.: R. E. Davis and A. Deutsch.

Oryx Electrical Laboratories Ltd. 24 Basinghall St, E.C.2. Nom. cap.: £100. Dirs.: C. S. R. Wotton and Vera Wotton.

T. M. Banner Ltd. 45 Broadway, Liverpool 11. To acquire business of radio, television and electrical engineers and cycle dealers carried on as "T. M. Banner" at Broadway, Liverpool 11. Nom. cap.: £1,000. Perm. gov. dir. and ch.: T. M. Banner.

Pyrad Electric Ltd. Heating, ventilating, air conditioning, refrigerating, sanitary, constructional and general engineers, etc. Nom. cap.: £100. Dirs.: to be appointed by subs. Subs.: A. T. Grieve and O. H. Gieson, 18 Austin Friars, E.C.2.

Electricold Refrigeration Co. (Lewes), Ltd. 83 Valence Rd, Lewes. Nom. cap.: £500. Dirs.: J. R. Bailey and Mrs G. E. Bailey.

P. J. Wheeler Ltd. 28 Chislehurst Rd, Orpington, Kent. Electrical engineers and general electrical installation contractors, wireless engineers, etc. Nom. cap.: £500. Perm. dirs.: P. J. Wheeler and P. J. Williams.

P. J. Long Ltd. 94 Gloucester Place, W.1. Industrial, commercial, domestic and cold storage refrigeration engineers, etc. Nom. cap.: £100. P. J. Long signs as director.

E. Crosby and Son Ltd. 10 Clarendon Rd, Leeds, 2. Plumbing contractors, glaziers, heating, lighting, ventilating and sanitary engineers, etc. Nom. cap.: £100. Dirs.: P. Crosby and Mrs. I. Crosby.

Electro-Mechanical Supplies (Leicester) Ltd. 28-32 The Butts, Coventry. Manufacturers and fabricators of electrical goods, etc. Nom. cap.: £5,000. Perm. dirs.: G. Lockwood and J. M. Hollander.

W. H. Battarbee (Electrical Contractors) Ltd. The Mansion Hse, Dartmouth. Nom. cap.: £1,000. Dirs.: W. H. Battarbee, Betty I. Battarbee, G. S. Battarbee and J. Firth.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Lupus. 736,374. Class 9. Circuit breakers, etc. M.C.B. Co. (Manchester), Ltd., 6 Melrose Ave, Brooklands, Sale, Manchester.

Crusader. 736,474. Class 11. Cooking stoves and water heaters. Simplex Electric Co., Ltd., Broadwell, Oldbury, Birmingham.

Kylchil. B736,766. Class 11. Heaters. P. R. Weaver Ltd., 14/16 Windmill Lane, E.15.

Anchor. 734,771. Class 6. Washing machines. Anchor Investment Co., Ltd., 54 Bridge St, Manchester 3.

Welstat. 731,901. Class 9. Resistances. Welwyn Electric Laboratories Ltd., Trading Estate, Bedlington Station, Northumberland.

Wesculite. 736,375. Class 9. Oil-immersed metal rectifiers. Westinghouse Brake and Signal Co., Ltd., 82 York Way, N.1.

Princessa. 737,093. Class 9. Wireless, television, etc., Vidor Ltd., West St, Erith, Kent.

Tectona. 737,200. Class 11. Teak standards for table lamps. Metwood Accessories, 65 Church St, Wolverton, Bucks.

Kedafon. 737,139. Class 9. Telephonic apparatus. Fonadek (Branson) Ltd., Knightsdowne House, Vivian Rd, Harborne, Birmingham 17.

Creda Carefree. 736,473. Class 11. Cooking stoves and water heaters. Simplex Electric Co., Ltd., Broadwell, Oldbury, near Birmingham.

Feral. 737,162. Class 17. Tapes and wrappings for use in insulating, etc. Winn and Coales Ltd., Saville Works, Croydon Rd, Beckenham Kent.

V.C.S. Electravac. 734,290. Class 9. Suction cleaners, etc. Bylock Electric Ltd., 109 South St, Enfield, Middx.

Simplex Emperor. 736,324. Class 9. Switches, switchboards, etc. Simplex Electric Co., Ltd., Broadwell, Oldbury, Birmingham.

Delaray. B736,691. Class 10. Lamps for surgical and curative purposes. Delawarr Laboratories, Raleigh Park Rd, Oxford.

Muralux. 734,940. Class 11. Lighting fittings. Holophane Ltd., Elverton St, Vincent Sq, S.W.1.

Alcorlin. 737,263, and **Circorlin.** 737,264. Electrical insulating materials. Richard Thomas and Baldwins Ltd., R.T.S.C. Hse, Park St, W.1.

MEETINGS TO NOTE

THURSDAY, 3 MAR.

I.E.E. (London). "Electrical Engineering Industry in the Post-War Economy—2" G. L. E. Metz. Savoy Place, W.C.2, 5.30 p.m.

I.E.S. (Cardiff). "Architect's Approach to Artificial Lighting," J. D. Layton. Elect. Offices, The Hayes, 5.45 p.m.

I.E.S. (Glasgow). "Flicker in Relation to Fluorescent Lighting," R. G. Hopkinson. 39 Elmbank Cresc, 7.30 p.m.

I.E.S. (Nottingham). "Colour and Colour Vision," W. D. Wright. Elect. Offices, Smithy Row, 6 p.m.

INCORP. PLANT ENGRS. (Peterborough). "Space Heating," G. A. Rooley. Campbell Hotel, Bridge St, 7.30 p.m.

INCORP. PLANT ENGRS. (Southampton). Annual meeting. Polygon Hotel, 7.30 p.m.

A.S.E.E. (S. London). "Industrial X-rays." F. L. Veale. Cafe Royal, North End, Croydon, 8 p.m.

CHELMSFORD ENGRNG. SOC. "Peace-time Use of Atomic Energy," L. A. Rotherham. Hoffmann's Social Hall, 7.30 p.m.

BRITISH INSTN. OF RADIO ENGRS. (Merseyside). "Electronics in Industry." College of Technology, Byrom St, Liverpool, 7 p.m.

BRITISH INSTN. OF RADIO ENGRS. (N. Western). "Computing Circuits in Flight Simulators," A. E. Cutler. College of Technology, Sackville St, Manchester, 7 p.m.

FRIDAY, 4 MAR.

I.E.E. (Mersey and N. Wales). Dinner-dance at Hulme Hall, Port Sunlight, 7 p.m.

I.E.E. (E. Midland). Annual dinner at Victoria Station Hotel, Nottingham.

I.E.E. Scottish Centre dinner at Caledonian Hotel, Edinburgh, 7 p.m.

INCORP. PLANT ENGRS. (Edinburgh). Annual dinner and Ladies' evening, Roxburghe Hotel.

A.S.E.E. (Bristol). Film show at Angel Hotel, Bath, 8 p.m.

A.S.E.E. (Liverpool). "Earth Leakage Circuit-Breakers," Mr Hoban. Liverpool Engineering Soc., 9 The Temple, 24 Dale St, 7.30 p.m.

A.S.E.E. (N.W. London). Branch lecturettes at Century Hotel, Forty Ave, Wembley Park, 8.15 p.m.

INST. OF FUEL (S. Wales). "Atomic Energy," Dr P. McNair. Y.M.C.A., Kingsway, Swansea, 6 p.m.

BIRMINGHAM ELECTRIC CLUB. Ladies' evening. Grand Hotel, 7 p.m.

MANCHESTER ASSOC. OF ENGRS. "Electronic Aids to Production," N. W. S. Ingles, Engrs. Club, Albert Sq, 6.45 p.m.

SATURDAY, 5 MAR.

INCORP. PLANT ENGRS. (Dundee). Annual dinner and dance at Mathers Hotel.

MONDAY, 7 MAR.

I.E.E. (London). Discussion on "What is Future of Steam Locomotive?" C. M. Cock. Savoy Place, W.C.2, 5.30 p.m.

I.E.E. (Mersey and N. Wales). "Criterion of Distribution Cost." D. J. Bolton. Liverpool Royal Instn., Colquitt St, 6.30 p.m.

I.E.E. (N.E. Radio and Measurements). "Standard Frequency Transmissions," L. Essen; "Standard Frequency Monitor at N.P.L.", J. McA. Steele; "Standard Frequency Transmission Equipment at Rugby Radio Station," H. B. Law. King's College, Newcastle, 6.15 p.m.

I.E.E. (S. Midland). "Short-Circuit Forces on Turbo-Alternator End Windings." J. B. Young and D. H. Tompsett. James Watt Inst., Great Charles St, Birmingham, 6 p.m.

I.E.E. (S. Midland). "Brushless Variable Speed Induction Motor." Prof F. C. Williams. Winter Gardens Restaurant, Gt. Malvern, 7.15 p.m.

I.E.E. (Maidstone). "Aluminium-Sheathed Cables." P. M. Hollingsworth. Wig and Gown Hotel, 7.30 p.m.

I.E.E. (Ipswich). "Research in Electrical Manufacturing Industry." L. J. Davies. Crown and Anchor Hotel, 6.30 p.m.

NORTH EAST ELECTRICAL CLUB. "Water Heating." J. T. Sanders. Liberal Club, 98 Pilgrim St, Newcastle, 6.30 p.m.

ROCHDALE ELECT. TRADES TECH. SOC. "Electrical Generation," J. L. Ashworth. Electric Hse, Smith St, 7.45 p.m.

A.S.E.E. (Leeds). "Power Factor Correction." L. Brecknell. Great Northern Hotel, 7.30 p.m.

TUESDAY, 8 MAR.

I.E.E. (E. Midland). Junior members' night at Gas Offices, Nottingham, 6.30 p.m.

I.E.E. (N. Western). Annual dinner at Midland Hotel, Manchester, 7.15 p.m.

I.E.E. (N. Ireland). "Electricity in Wool Textile Industry." A. J. Francis and T. H. Carr. Queen's Univ., Belfast, 6.30 p.m.

I.E.E. (London Students). "Development of Fluorescent Tube Control." G. V. McNeill. R.E.M.E. Training Centre, Arborfield, Berks, 7 p.m.

I.E.S. (Stoke-on-Trent). "Home Lighting." Mrs J. W. Stewart. Joint meeting with E.A.W. Elect. Offices, 31 Kingsway, 6 p.m.

WEDNESDAY, 9 MAR.

A.S.E.E. (Birmingham). "Oils and Greases." Chamber of Commerce, New St, 7.15 p.m.

A.S.E.E. (Bradford). "Recruitment and Training of Apprentices for Engineering Industry." S. R. Noble. Midland Hotel, 7.30 p.m.

A.S.E.E. (Southampton). Lecturettes at Polygon Hotel, 8.15 p.m.

A.S.E.E. (York). "Electronic Control." Picture Hse Cafe, Coney St, 7.15 p.m.

I.E.E. (London Radio). "Artificial Reverberation." P. E. Axon, C. L. S. Gilford and D. E. L. Shorter. Savoy Place, W.C.2, 5.30 p.m.

I.E.E. (N. Scotland). "Special Effects for TV Studio Productions." A. M. Spooner and T. Worswick. Caledonian Hotel, Aberdeen, 7.30 p.m.

I.E.E. (Southern). "Manchester-Kirk o' Shotts TV Radio Relay System." G. Dawson, L. L. Hall, K. G. Hodgson, R. A. Meers and J. H. H. Merriman. Portsmouth College of Technology, 6.30 p.m.

I.E.E. (Oxford). "Some Aspects of Design of VHF Mobile Radio Systems." E. P. Fairbairn. Elect. Offices, 37 George St, 7 p.m.

I.E.S. (London). Trotter - Paterson Memorial Lecture by Sir Harold Spencer Jones, Astronomer Royal. Royal Instn., Albemarle St, W.1, 6 p.m.

BRITISH INSTN. OF RADIO ENGRS. (N. Eastern). "Application of Negative Feedback to Electrical Measuring Instruments." F. J. U. Ritson. Neville Hall, Westgate Rd, Newcastle, 6 p.m.

BRITISH INSTN. OF RADIO ENGRS. (W. Midland). "Electrical Standards in Electronics." P. M. Clifford. Tech. College, Wulfruna St, Wolverhampton, 7.15 p.m.

INCORP. PLANT ENGRS. (E. Midland). Annual meeting at Adult Education Centre, Shakespeare St, Nottingham, 7 p.m.

THURSDAY, 10 MAR.

I.E.E. (London). "Electrical Equipment of Toronto Subway Cars." F. W. Roberts. Savoy Place, W.C.2, 5.30 p.m.

I.E.E. (N. Scotland). "Special Effects for TV Studio Productions." A. M. Spooner and T. Worswick. Queen's College, Dundee, 7 p.m.

I.E.E. (Swansea). "Some Design Features of Semi-Outdoor Power Station at Ince." F. H. S. Brown. Elect. Showrooms, Kingsway, 6 p.m.

I.E.E. (Norwich). "Fuel Supplies of Future." D. Hicks. Assembly Hse, 7.30 p.m.

I.E.S. (Manchester). Members' Night. Elect. Offices, Town Hall, 6 p.m.

DERBY ELECTRICAL SOC. Ten minute papers by junior members. Elect. Offices, Irongate, 7 p.m.

BRITISH INSTN. OF RADIO ENGRS. (Scottish). "Computing Circuits in Flight Simulators." R. A. Marvin. 39 Elmbank Cresc, Glasgow, 7 p.m.

FRIDAY, 11 MAR.

I.E.E. (N. Staffs). "Possibilities of Cross-Channel Power Link between British and French Supply Systems." D. P. Sayers, M. E. Laborde and F. J. Lane. Elect. Showrooms, Stoke-on-Trent, 7 p.m.

I.E.E. (Western). Annual dinner and dance at Grand Spa Hotel, Bristol, 7 p.m.

I.E.S. (Nottingham). Ladies' evening at Victoria Station Hotel.

BRITISH REFRIGERATION ASSOC. Banquet at Savoy Hotel, London.

MANCHESTER ASSOC. OF ENGRS. Dinner and dance at Grand Hotel.

MONDAY, 14 MAR.

I.E.E. (N. Eastern). "Automatic Circuit Reclosers." G. F. Peirson, A. H. Pollard and N. Core. Neville Hall, Newcastle, 6.15 p.m.

I.E.E. (S. Midland Supply and Utilisation). "Repairing Electrical Plant," J. Ashmore. Imperial Hotel, Birmingham, 6 p.m.

I.E.E. (Western Supply). "Supply to Industry from point of view of Consumer, Commercial Engineer and Distribution Engineer." R. H. Cobbold, W. P. Warren and J. S. Lombard. Elect. Offices, Colston Ave, Bristol, 6 p.m.

I.E.E. (Reading). Open Forum. George Hotel, 7.15 p.m.

I.E.E. (London Students). "Air Transportation." Sir Miles Thomas. Instn. of Civil Engrs., Great George St, S.W.1, 6.30 p.m.

I.E.S. (Sheffield). Paper by Miss H. M. Maurice.

LEICESTER ELECTRICAL SOC. "Interference Suppression." A. Hale. Elect. Offices, Charles St, 7 p.m.

INST. OF FUEL (N. Eastern). "Wind and Solar Energy." Prof P. A. Sheppard. King's College, Newcastle, 6.30 p.m.

TRADE NOTES

New Factory. Ultra Electric Ltd. have opened a factory at Grosvenor Rd, St Albans.

Laboratories. New extensions to the Murex Research Laboratories at Waltham Cross have recently been completed. The department now covers an area of some 28,800 sq ft.

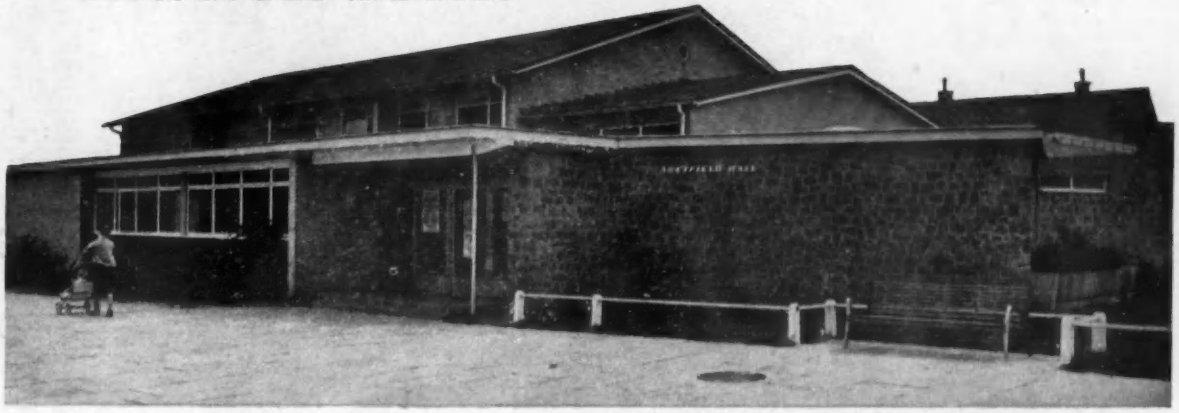
Newcastle Branch. The Export Credits Guarantee Department have opened a new branch at Newcastle-upon-Tyne, to serve the areas of Tyneside, Wearside and Tees-side. Pending completion of the new offices, the manager, Mr J. A. Bookless, is operating from temporary premises at 93a Grey St, Newcastle-upon-Tyne 1. (Telephone: Newcastle 26011).

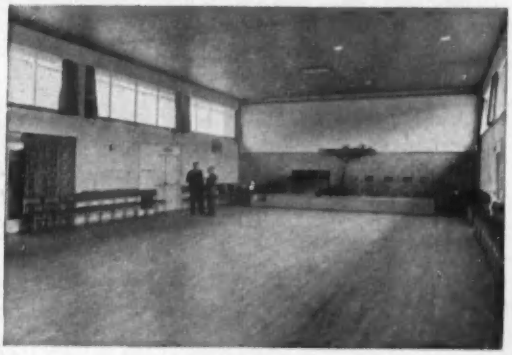
Changes of Address. The Foreign Labour Division of the Ministry of Labour and National Service has moved to Ebury Bridge Hse, Ebury Bridge Rd, London, S.W.1. Any communications or enquiries regarding the issue of permits under the Aliens Order 1953 to bring foreigners to this country for employment should be made to that address.

As from 14 March the offices of Jenolite Ltd., will be at 13-17 Rathbone St, London, W.1. Telephone: Museum 5411. For several years the firm has had a number of departments operating at 13-15 Rathbone St, and No. 17 has now been acquired.

Extension. New Welbeck Ltd. have asked Brighton Corporation to extend by approximately 7,000 sq ft, the factory now being erected for them at East Moulescomb. The Land and Works Committee has recommended the Council to approve the extension.

The First Permanent Community Hall in a New Town





ADEYFIELD HALL HEMEL HEMPSTEAD, is the first permanent Community Hall and Ballroom to be erected in a New Town.

Designed on the most modern lines, it provides the centre of social life for the citizens of Hemel Hempstead's first neighbourhood. The all-electric installation was carried out by The Eastern Electricity Board, for the Hemel Hempstead Development Corporation. Over 3½ miles of Henley V.I.R. cables have been used in the Lighting, Heating, Cooking, and Air-conditioning circuits.

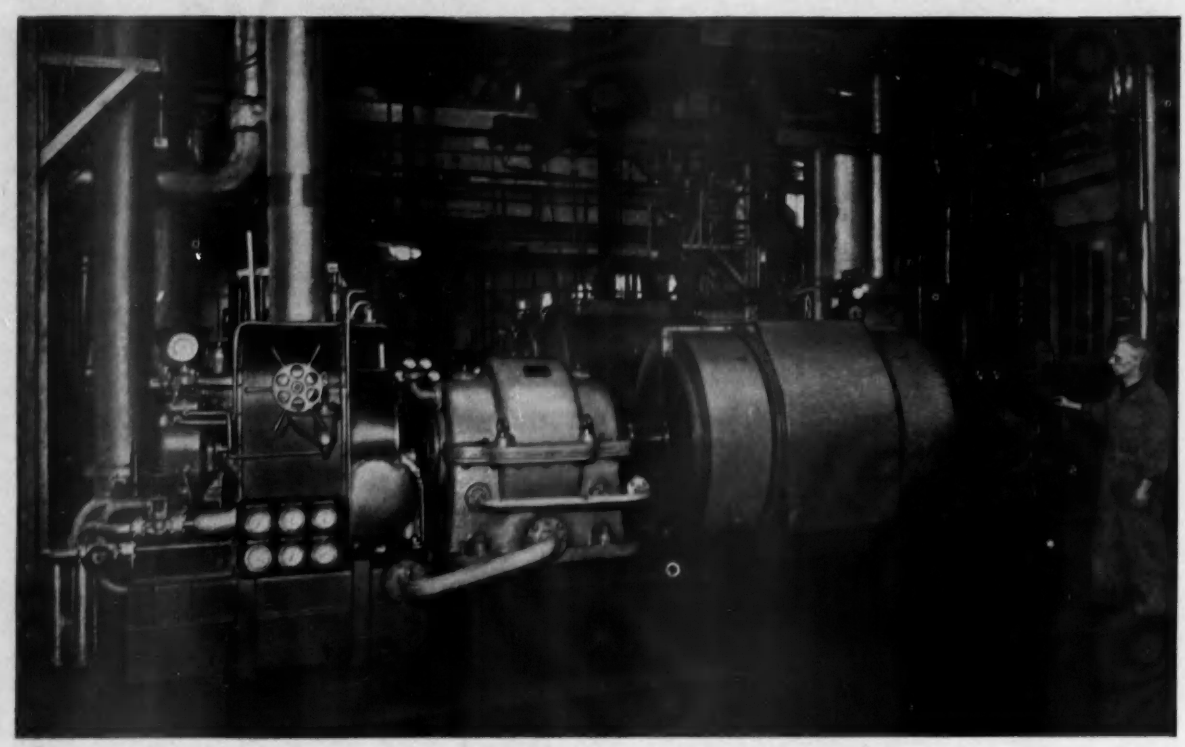
WIRED THROUGHOUT WITH HENLEY CABLES

BY APPOINTMENT ELECTRIC CABLE MANUFACTURERS TO THE LATE KING GEORGE VI

W. T. HENLEY'S TELEGRAPH WORKS COMPANY LIMITED, 51-53 HATTON GARDEN, LONDON, E.C.1

G

Small Back Pressure Turbines



—and Fuel Economy

The photograph shows one of two 1,250 kW geared back pressure turbo-generators installed in the power house of the Trafford Park works of Metropolitan-Vickers providing steam for factory heating and processes at the minimum fuel cost. Similar machines varying from 100 kW to 2,000 kW are in service in various industries.

Larger direct-coupled back pressure turbo-generators with outputs up to 30,000 kW, and for the highest initial steam conditions in commercial use, have been manufactured for industrial undertakings requiring large quantities of low or medium pressure steam at the highest overall economy.

Write for descriptive leaflet No. 444/2-1

METROPOLITAN-VICKERS
ELECTRICAL CO LTD · TRAFFORD PARK · MANCHESTER 17

B/L401

Member of the A.E.I. group of companies

CLASSIFIED ADVERTISEMENTS

Advertisements should be sent to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London, W.C.2, before 10 a.m. on TUESDAY of the week of issue. Official Displayed Advertisements are charged at 32s. 6d. per inch, and all other classified advertisements at 2s. 6d. per line. Situations Wanted four insertions at twice the single insertion rate. Fee for Box Number and postage on replies 2s.

TENDERS INVITED

CITY OF MANCHESTER
Housing Committee

TENDERS are invited for electrical installations to 18 Aged People's Dwellings—Contract 221—at Langley Estate, Middleton.

Tender Forms and Schedules may be obtained on application to the Director of Housing, Town Hall, Manchester 2, and must be returned in a sealed official envelope endorsed "Electrical Installations," and be received by the Town Clerk not later than noon on Monday, 21 Mar., 1955.

PHILIP B. DINGLE,
Town Clerk.
(R 107)

APPOINTMENTS VACANT

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18–64, or a woman aged 18–59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

BRITISH ELECTRICITY AUTHORITY
South Western Division

ASSISTANT SHIFT CHARGE ENGINEER required at Hayle Generating Station.

Superannuation Scheme. Salary, N.J.B. Class F, Grade 9, £675/£720.

Applicants should have had a sound technical training and practical experience in a modern generating station.

Applications on Form A.E.6/ACT, obtainable from the Divisional Secretary, 26 Oakfield Rd, Bristol 8, should be completed and returned by 14 Mar, 1955.
(R 83)

BOROUGH OF ILFORD
Appointment of
ASSISTANT ELECTRICAL ENGINEER

ASSISTANT ELECTRICAL ENGINEER, A.P.T. III/IV. Candidates should preferably be A.M.I.E.E. or hold the Higher National Certificate for Electrical Engineering and have served an apprenticeship in this field. Applicants must have experience in the preparation of estimates, specifications, designs, drawings, supervision of work on site and testing in schools, public buildings, housing, pumping stations and street lighting. Salary £600/£825 per annum, plus London Weighting, the commencing salary being within the range but not exceeding £705 per annum, excluding London Weighting.

Appointments superannuable and subject to medical examination.

Application forms obtainable from the Town Clerk, Town Hall, Ilford, Essex, upon receipt of stamped addressed envelope, should be returned not later than 19 Mar.
(R 23)

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

APPLICATIONS are invited for two COMMERCIAL ASSISTANTS in the Chief Commercial Engineer's Department at the Board's Head Office in Edinburgh. The posts are superannuable and will entail travelling throughout the Board's Area.

The salary for each position will be N.J.C. Grade 5, £720 x £25—£795, with placing according to qualifications and experience.

Application form, obtainable from the subscriber, should be returned completed by 12 Mar., 1955. H. W. SIMPSON,
Secretary
16, Rothesay Ter, Edinburgh 3. (R 97)

BROADSTAIRS AND ST. PETERS URBAN DISTRICT COUNCIL
Waterworks Department
ASSISTANT STATION ENGINEER

APPLICATIONS are invited for an Assistant Station Engineer for Rumfields Pumping Station in the department of the Water Engineer, at a wage in accordance with Grade IV of the Miscellaneous Classes of Officers (£465/£545 per annum).

Applicants must be experienced in the maintenance of A.C. electric motors, automatic controls, general wiring and preferably have had experience of diesel engines and waterworks routine, including pumping and softening.

The successful applicant will be required to live in a 5-roomed house next to the Pumping Station (inclusive rent—£73 per annum approx.).

Applications endorsed "Assistant Station Engineer," stating age, qualifications, present and past appointments and experience, together with the names of two referees, should be addressed to Kenneth Josey, A.M.I.C.E., Water Engineer, Pierremont Hall, High St, Broadstairs, to be received not later than 12 noon on Monday, 14 Mar., 1955.

H. C. NORRIS,
Clerk of the Council.
(R 24)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the appointment of SERVICE CENTRE SUPERVISOR at Warrington. Salary within the range £720/£795 per annum. (N.J.C. Grade 5).

Applicants should have had a sound training on the commercial side of an electricity undertaking or in the electrical retail trade, and must have a wide knowledge of modern electrical appliances for commercial and domestic use.

The duties will include the supervision and control of the Service Centre, the display of apparatus, hire purchase transactions, and receipt of accounts.

The appointment is superannuable and subject to medical examination.

Applications, stating age, experience, qualifications, and present appointment, should be sent to the Manager, No. 2 Sub-Area, MANWEB, Sandiway Hse, near Northwich, Cheshire, not later than 14 Mar., 1955. (R 48)

THE NORTH WESTERN ELECTRICITY BOARD

APPOINTMENT OF THIRD ASSISTANT ENGINEER (TESTING), TECHNICAL AND RESEARCH SECTION, CHIEF ENGINEER'S DEPARTMENT, AREA BOARD HEADQUARTERS, MANCHESTER

DUTIES will include the testing of all types of equipment used on a distribution system. Experience in metering and protective gear testing will be an advantage. Applicants should hold the H.N.C. in Electrical Engineering or its equivalent.

Salary Scale: £750/£975 per annum. Class AX/EX Grade 4. N.J.B. Conditions.

APPOINTMENT OF JUNIOR ENGINEER (TESTING), TECHNICAL AND RESEARCH SECTION, CHIEF ENGINEER'S DEPARTMENT, AREA BOARD HEADQUARTERS, MANCHESTER

The person appointed will be required to assist in the testing of all types of equipment used on a distribution system.

Experience in metering and light current work generally will be an advantage. Applicants should hold the O.N.C. in Electrical Engineering or its equivalent.

Salary Scale: £475/£630 per annum. Class AX/EX Grade 7. N.J.B. Conditions.

Applications for above posts to Establishment Officer, The North Western Electricity Board, Cheetwood Rd, Manchester, 8, by 12 Mar., 1955.

APPOINTMENT OF SENIOR ASSISTANT ENGINEER (DOMESTIC AND COMMERCIAL) SUB-AREA CONSUMERS' ENGINEER'S DEPARTMENT, MANCHESTER

The post is that of Senior Assistant responsible to the Sub-Area Consumers' Engineer for the general development of domestic and commercial loads in the Sub-Area and for the supervision of staff engaged on this work.

Salary Scale: £1,295 x £35—£1,400 per annum. Grade L.4. N.J.B. Conditions.

Applications to Sub-Area Secretary, No. 1 Sub-Area, The North Western Electricity Board, Town Hall, Manchester, 2, P.O. Box 493, by 12 Mar., 1955.

APPOINTMENT OF SECOND ASSISTANT DISTRICT ENGINEER, ROSSENDALE DISTRICT

Duties will include assistance in the operation, maintenance and construction of underground and overhead mains, substations and transformers, and general mains and standby duties.

Preference given to applicants who are Corporate or Graduate Members of the Institution of Electrical Engineers, or who possess the H.N.C. in Electrical Engineering.

Salary Scale: £715 x £15—£760 per annum. Grade E.7. N.J.B. Conditions.

Applications to Sub-Area Manager, No. 5 Sub-Area, The North Western Electricity Board, Jubilee St, Blackburn, by 12 Mar., 1955. (R 67)

BRITISH ELECTRICITY AUTHORITY
London Division

APPLICATIONS are invited for the following Superannuable posts.

3RD ASSISTANT ENGINEERS—TRANSMISSION DEPARTMENT DIVISIONAL HEADQUARTERS

Vacancy No. 55/164
(Amended Notice)

Candidates should have for first vacancy:

Experience in the laying, jointing and testing of underground cables up to 132 kV and also have experience in the design and manufacture of cables and cable systems.

For second vacancy:

Experience in the design, layout and site installation of High Voltage Substation equipment, together with a knowledge of site testing and commissioning of Substation plant.

Applicants should have qualifications entitling to Corporate Membership of the I.E.E.

Salary and conditions of service in accordance with N.J.B. Agreement, Schedule C, Class AX/EX, Grade 4=£787. 10s./£1,023. 15s. per annum.

Applications, quoting vacancy number, may be made on form obtainable from Divisional Secretary, British Electricity Authority, London Division, P.O. Box 136, Generation House, Great Portland St, W.1, and be received within 14 days of this advertisement. (R 101)

BRITISH ELECTRICITY AUTHORITY
North West, Merseyside & N. Wales Division

VACANCY No. E.85/73/T.—ASSISTANT ENGINEER (Operation) at Percival Lane Generating Station, Runcorn. Salary £595/£640 (G.12).

Apply to Divisional Secretary, British Electricity House, 825 Wilmslow Rd, Manchester 20, before 12 Mar. Quote vacancy No. (R 82)

THE NORTH EASTERN ELECTRICITY BOARD
Harrogate Sub-Area

APPLICATIONS are invited for the appointment of SECOND ASSISTANT COMMERCIAL ENGINEER, Harrogate. Applicants should be preferably Corporate Members of I.E.E. or possess equivalent qualifications, and have experience of utilisation of electricity for agricultural, horticultural and other rural purposes.

Salary—Schedule A, Class G, Grade 7, £790/£850, N.J.B. Conditions of Service.

Applications stating age, qualifications and experience should be forwarded to the Secretary (Establishments), The North Eastern Electricity Board, G.P.O. Box No. 117, Carliol House, Newcastle upon Tyne 1, within ten days of the appearance of this advertisement. (R 102)

BRITISH ELECTRICITY AUTHORITY
East Midlands Division

APPLICATIONS are invited for the following positions within the Division:

SECTION LEADER (CIVIL)
GENERATION (CONSTRUCTION) DIVISIONAL HEADQUARTERS
Vacancy No. 38/55/ET

Candidates should be capable of taking charge of a Civil Section in the Generation (Construction) Drawing Office, and should have experience in the design and detail of heavy reinforced concrete structures, heavy foundations, retaining walls, culverts, etc.

Preference will be given to candidates holding qualifications equivalent to Corporate Membership of the Institution of Civil Engineers.

Salary in accordance with Schedule D, Grade 3 (£860 x £20—£960 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 14 Mar., 1955.

WAYLEAVE OFFICER
DIVISIONAL HEADQUARTERS
Vacancy No. 35/55/ET

Candidates should be of good education and have experience of negotiating with owners of property to arrange Wayleaves connected with the erection of overhead transmission lines, settlement of damage to crops, etc., during erection of lines.

Experience in negotiating tree felling and valuation desirable.

The successful applicant will be required to provide a car for this appointment for which appropriate allowance will be made.

Salary will be in accordance with Grade 3 (£585/£645 per annum) of the National Joint Council Agreement.

Closing date for receipt of applications, 14 Mar., 1955.

SENIOR DRAUGHTSMAN,
TRANSMISSION DEPARTMENT,
DIVISIONAL HEADQUARTERS
Vacancy No. 39/55/ET

Previous experience on the design and construction of H.V. Substations, overhead Transmission Lines or Cable Systems preferred, but is not essential.

Salary will be in accordance with Schedule D, Grade 5 (£640 x £20—£740 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 14 Mar., 1955.

These appointments will be pensionable within the terms and provisions of the British Electricity Authority and Area Boards Superannuation Scheme.

Applications should be submitted on the official form A.E.6/ACT which may be obtained from the Divisional Establishments Officer, British Electricity Authority, P.O. Box 25, Barker Gate, Nottingham, and should be returned to the undersigned by the date stated. Please quote Vacancy Number.

L. F. JEFFREY,
Divisional Controller.
(R 44)

SOUTH EASTERN ELECTRICITY BOARD

SENIOR SHOWROOM ASSISTANT—PURLEY DISTRICT

SALARY £585 x £20—£645 plus London Weighting under N.J.C. Grade 3. Superannuable. Applicants should have experience of showroom sales and service work, including supervision of staff and control of stock.

Applications, naming 2 referees, on forms from J. McAlister, B.SC., A.M.I.E.E., District Manager, SEEBoard, Electric House, High St, Purley, Surrey, by 16 Mar., 1955.

SHOWROOM ASSISTANTS (MALE OR FEMALE) —WORTHING DISTRICT

Salary within range Male £170/£410 per annum or £190/£495 per annum; Female £145/£349 per annum or £162/£420 per annum according to age and experience. New entrants for the higher scale must have obtained the General Certificate of Education at ordinary level in at least four subjects including English and Mathematics. Superannuable. Applicants should preferably have experience in dealing with Showroom enquiries and sales of electrical appliances. The persons appointed must be prepared to work in any of the Worthing district showrooms.

Applications, naming 2 referees to M. J. Mortimer, M.I.E.E., District Manager, SEEBoard, 56 Chapel Rd, Worthing, Sussex, by 16 Mar., 1955.

A. L. BURNELL,
Secretary.
(R 105)

AIR MINISTRY

require MECHANICAL and ELECTRICAL ENGINEERS in Works Department for design, operation and maintenance of mechanical and electrical services on R.A.F. stations at home and overseas and Civil Aviation Stations. Appointments in two grades (*a*) Main Grade, salary scale £1,118/£1,463. (*b*) Assistant Grade £729/£1,118. Starting pay according to qualifications and experience. Salaries somewhat lower in provinces. Candidates should be age 25 or over. Appointments temporary and non-pensionable but with long term possibilities. Special allowance up to £1,500 a year according to location payable in addition to salary during overseas service. Candidates must be natural born British subjects of natural born British parents. *Minimum* qualifications and experience for both grades of posts: (i) (*a*) University degree or equivalent diploma in electrical and/or mechanical engineering and at least a two year apprenticeship, or (*b*) Graduate or Corporate Membership of the Institutions of Mechanical or Electrical Engineers with appreciable electrical engineering experience and at least three year apprenticeship and (ii) employment in responsible position for minimum of three years with well established engineering concern providing wide experience in electrical and mechanical engineering practice.

Application forms quoting reference D.530/54-A from M.L.N.S. Technical and Scientific Register (K), Almack House, 26 King St, London, S.W.1. (R 106)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

SYSTEM CONTROL ENGINEER required in the No. 4 Sub-Area Operation Department based on the Control Centre at Legacy, near Wrexham. Salary £755/£800 per annum (N.J.B. J/10).

Duties, which will be on a shift basis, will be those normally associated with switching operations and load transfers on an extensive E.H.V. system inter-connecting 132/33 kV injection points and a number of hydro-electric stations.

Applicants should have had operational experience in distribution work and in substations. Possession of the technical qualifications necessary to enable them to become Chartered Electrical Engineers advantageous.

The appointment is superannuable and subject to medical examination.

Application forms obtainable from the Manager, Merseyside and North Wales Electricity Board, No. 4 Sub-Area, Electricity House, Rhostyllen, near Wrexham. (R 22)

NORTHERN RHODESIA
Municipality of Livingstone

APPLICATIONS are hereby invited for the following vacancies in the Electricity Department:

(*a*) ENGINEERING ASSISTANT (ELECTRICAL). Basic Salary Scale per year £984 x £48—£1,128.

(*b*) TECHNICAL CLERK. Basic Salary Scale per year £744 x £32—£840.

In the case of (*a*) candidates must have had experience in both underground and overhead distribution systems up to 11,000 V and must have spent 5 years in a similar capacity with an Electricity Supply Undertaking. Corporate Membership of the Institution of Electrical Engineers will be an added recommendation.

In the case of (*b*) candidates should be able to keep all statistical data, and to maintain the technical and administration records of the Department. It is essential that candidates should have had similar experience in an Electricity Supply Undertaking.

Housing free of rent and rates or allowance in lieu. Temporary cost-of-living allowance payable, at present 8·5% of basic salary. Contributory pension and medical aid schemes. Assisted passages and generous leave provisions. The appointments will be subject to a probationary period not exceeding 12 months.

Abridged conditions of service may be obtained from the Commissioner for Northern Rhodesia, 57 Haymarket, London, S.W.1, to whom applications, in duplicate, accompanied by a recent certificate of medical fitness and copies of three recent testimonials, should be sent to arrive not later than 11 Mar., 1955.

Canvassing of Councillors will disqualify candidates for appointment, and applicants must disclose whether they are related to any member or officer of the Council.

H. T. R. MORGAN,
Livingstone, Acting Town Clerk.
Northern Rhodesia.
25 Feb., 1955. (R 66)

BRITISH ELECTRICITY AUTHORITY
South Wales Division

Vacancy No. 23/55

APPLICATIONS invited for superannuable N.J.B. appointment of ASSISTANT MAINTENANCE ENGINEER (MECHANICAL) at Llynfi Power Station.

Salary: G.8, £755 x £15—£800.

Applicants should have had previous maintenance experience; H.N.C. or equivalent desirable.

Application forms obtainable from Secretary, South Wales Division, British Electricity Authority, Twyn-y-Fedwen Rd, Gabalfa, Cardiff, to be returned by 18 Mar., 1955. (R 113)

GOVERNMENT OF CYPRUS

A VACANCY exists for a FORCE COMMUNICATIONS OFFICER in the Police Department (*a*) to advise on the equipment required for organising and expanding the police communications network and to prepare indents and supervise installation; (*b*) to be responsible for the training of operators and staff and for carrying out all the technical and administrative duties which the expansion of police communications will entail; (*c*) to train a Cypriot Officer to succeed him in due course.

Candidates must be under 50 years of age, physically fit and be qualified radio engineers with experience of VHF and police communications.

Appointment will be on contract for 2 years in the first instance subject to renewal. Salary £1,064/£1,274 per annum according to qualifications and experience. Overseas allowance 15% of salary. Gratuity of £37. 10s. for each completed period of 3 months' service payable on satisfactory completion of engagement. Government quarters at low rent or allowance in lieu. Free passages for officer, wife and up to 3 children. Outfit allowance £30. Generous leave.

Candidates should write to the Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith St, London, S.W.1, giving personal particulars, qualifications and experience and quoting BCD 55/17/04. (R 116)

THE TRINIDAD AND TOBAGO ELECTRICITY COMMISSION

THE Trinidad and Tobago Electricity Commission requires:

(*a*) POWER STATION CHEMIST for the Generating Station, Port of Spain. Applicants must possess a B.SC. degree obtained at a recognised University or be an Associate of the Institute of Chemistry. The duties of this post consist mainly of the sampling and analyses of fuels, oils, and waters, the control of boiler feed water, and cooling water treatment, the analyses of deposits, etc., and such other chemical investigations as the Commission may require. Knowledge and experience of the chemical control of Power Station plant and materials and of the allied aspects of metallurgy are desirable. Experience of combustion efficiency methods will be an added advantage. The annual salary is £1,100 rising by annual increments of £27. 10s. to £1,182. 10s. After expansion the salary will rise by the same increments to £1,292. 10s.

(*b*) CHARGE ENGINEER for the Generating Station, Port of Spain. Applicants should have experience in the operation of modern Steam Turbines, Water Tube Boilers and Diesel Generators and must have Graduate Membership of the I.E.E., or I.Mech.E. or Assoc.I.Mar.E., or the Higher National Certificate in Mechanical Engineering, or 2nd Engineer's M.O.T. Diesel and Steam Certificates or R.N. equivalent. The installed capacity is at present 12·5 MW of steam turbines and Boiler Plant of 450 lb p.s.i. and 700° F. and 7·5 MW of large Diesel Generators and a 10 MW Turbo-Alternator is in process of erection.

(*c*) CIVIL ENGINEERING ASSISTANT for the Headquarters of the Commission at Port of Spain. Applicants must have a recognised University degree, or Graduate Membership of the Institution of Civil Engineers or Higher National Certificates in Civil Engineering. The duties of the post deal mainly with Civil Engineering work for medium size Power Stations. Applicants should have had at least three years' experience in design work in Reinforced Concrete Structures and Steelwork and Hydraulics, and the Planning of Structures, Foundations and Services associated with Power Stations. The work is varied and entails initiating projects, a fair amount of site work, and responsibility for dealing with contractors.

The annual salary for the above two posts is £1,045 rising to £1,127. 10s. by annual increments of £27. 10s. After expansion the salary will rise by the same increments to £1,237. 10s.

(*d*) TWO ASSISTANT AREA ENGINEERS. Applicants should hold a recognised University degree, or a Higher National Certificate in Electrical Engineering or Graduate Membership of the Institution of Electrical Engineers. Experience in the operation of distribution systems and the construction of overhead lines and the ability to control staff are essential. Candidates must be prepared to live at Penal or Arima. The annual salary for these two posts is £847. 10s. rising by annual increments of £22. 10s. to £915. When the areas sell more than 50 million units the salary will be £937. 10s. rising by the same increments to £1,005.

For all these posts a partly furnished house will be provided at a rent of 10% of salary to a maximum of £10. 8s. 4d. per month plus a small extra charge for heavy furniture. The successful candidates will be required to pass a medical examination and will be provided with first class passages for himself, his wife and two children up to the age of eighteen. A temporary cost of living allowance of £25 per annum is also paid. An outfit allowance of £60 is paid on arrival. Leave Passages to the United Kingdom will be provided every three years. Vacation, Casual and Sick Leave is given on full pay. There is a superannuation scheme similar to the B.E.A. and Area Boards Scheme. General information on Trinidad, Climate, Income Tax, etc., can be obtained from the West India Committee, 40 Norfolk St, London, W.C.2.

Applications giving full details of qualifi-

continued in next column

continued from previous column

cations, age, experience, etc., together with two recent testimonials should be sent by Airmail to reach the General Manager, Trinidad and Tobago Electricity Commission, Port of Spain, Trinidad by 16 Apr., 1955. (R 114)

THE ELECTRICITY BOARD
Belize, British Honduras

ELECTRICAL ENGINEER

APPLICATIONS are invited for the appointment of an Electrical Engineer in the service of the Electricity Board, Belize, British Honduras.

The present supply system which is 110/220 V, 3-wire D.C., is to be changed over to 6,600 V and 220 V, 3-phase, 60 cycles A.C., three new 800 kW diesel-alternator sets are to be installed and two existing 400 kW Diesel sets converted from D.C. to A.C.

The Engineer will be required, initially, to supervise the changeover of the distribution system from D.C. to A.C. and the erection of the generating sets and ultimately to take charge of the operation and maintenance of the distribution system and the generating plant.

Candidates should be Corporate Members of the Institution of Electrical Engineers or hold qualifications exempting them from the Institution examination and must have had considerable experience in the construction and operation of L.V. overhead distribution networks and H.T. overhead lines up to 6,600 V. They must also have had some experience in the erection and operation of diesel engines up to 1,000 h.p.

The appointment will be on a salary scale of £1,450 per annum rising by annual increasements of £75 to a maximum of £1,750 per annum. The point of entry into the salary scale will depend on the candidate's age, qualifications and experience. Details of Provident fund, 6%.

A car allowance of £5 per month will be paid.

The appointment will be for a period of 3 years in the first instance terminable by three months' notice on either side and may be renewable by mutual consent.

Free passages will be provided for the officer and his family up to four full passages, on first appointment, on termination of the agreement and for long leave in the United Kingdom.

Leave is earned at the rate of sixty days per year of residence in service and may be accumulated. (Earned leave to the United Kingdom may be taken after three years' service).

Applications endorsed "Electrical Engineer, Belize," stating age, qualifications and experience should be forwarded within 14 days of the date of this advertisement to the undersigned who will communicate with candidates selected for further consideration.

PREECE, CARDEW AND RIDER.
8/12 Queen Anne's Gate,
Westminster, S.W.1. (R 68)

BRITISH ELECTRICITY AUTHORITY
Midlands Division

SECOND ASSISTANT ENGINEER (Civil) is required in the Generation Construction Department at Wolverhampton. N.J.B. service conditions, superannuable appointment, salary within Schedule C, Grade 2, of the Agreement, commencing in range £950/£1,075, ultimately rising to £1,165 per annum.

Applicants should have had considerable experience in the design and construction of heavy foundations and building works associated with modern generating station; also in the preparation of preliminary schemes and estimates, specifications, bills of quantities for civil engineering and building works, writing of reports, and general control of building and civil engineering contracts. Sound theoretrical and practical experience on large contract work is essential. Candidates should preferably be corporate members of the Institution of Civil or Structural Engineers. Previous applicants for this position will be reconsidered.

Apply, quoting Vacancy No. 895MD, on form AE6, available from the Establishments Officer, 53 Wake Green Rd, Moseley, Birmingham 13, by 19 Mar., 1955. (R 81)

MIDLANDS ELECTRICITY BOARD

APPLICATIONS are invited for the following superannuable posts:

Central Gloucestershire Sub-Area

DISTRICT ENGINEER (CHELTENHAM DISTRICT)

Applicants should have had a sound technical training and extensive experience in the operation and maintenance of high and low voltage distribution networks and associated switchgear, transformers, and protective systems. Technical qualifications desirable. Salary £900/£975 per annum (N.J.B. Grade E.3).

THIRD ASSISTANT DISTRICT COMMERCIAL ENGINEER (STROUD DISTRICT)

Duties will include the preparation of wiring schemes and estimates for all types of premises and sale of electrical equipment associated therewith, also advice to consumers on utilisation of supply. Applicants should have had sound technical training and experience in the above duties. Salary £595/£640 per annum (N.J.B. Grade E.10).

Apply, in writing, within fourteen days stating age, experience, present position and salary to Mr D. Holt, Sub-Area Manager, Midlands Electricity Board, 126 London Rd, Gloucester.

South Staffs & North Worcs. Sub-Area

THIRD ASSISTANT DISTRICT ENGINEER (WEDNESBURY DISTRICT)

Applicants should have had experience in all branches of distribution work, including construction, operation and maintenance of high voltage and low voltage underground cables, overhead lines and substations. Technical qualifications desirable. Salary £715/£760 per annum (N.J.B. Class G, Grade 9).

Apply within seven days stating age, qualifications, experience, present position and salary to Mr T. G. Keeler, Sub-Area Manager (Ref. CW), Midlands Electricity Board, P.O. Box No. 9, Toll End Rd, Tipton, Staffs.

Wolverhampton & District Sub-Area

THIRD ASSISTANT DISTRICT ENGINEER (CANNOCK DISTRICT)

Applicants should have had experience in all branches of distribution work, including the operation and maintenance of high and low voltage cables and overhead lines, switchgear and transformers. Technical qualifications desirable. Salary £635/£680 per annum (N.J.B. Class E, Grade 9).

Apply within fourteen days stating age, qualifications and experience, present position and salary to Mr F. J. Elliott, Sub-Area Manager, Midlands Electricity Board, 83 Darlington St, Wolverhampton.

Worcester & District Sub-Area

WAYLEAVE OFFICER/SURVEYOR (KIDDERMINSTER DISTRICT)

Duties include surveying profiling, plotting routes of overhead lines and obtaining wayleaves. Salary £525/£585 per annum (N.J.C. Grade 2).

Apply in writing stating age, experience, present position, and salary, to the District Manager, Midlands Electricity Board, New Rd, Kidderminster.

A. STEPHENS,
Secretary.
(R 111)

METROPOLITAN WATER BOARD

APPOINTMENT OF ASSISTANT ENGINEERS (ELECTRICAL)

ASSISTANT ENGINEERS (Electrical) required for permanent pensionable staff. Salary scale £760/£30/£940 per annum. Commencing salary according to age and experience. Maximum age 45 years. It is a condition of the appointment to and the holding of the positions that the selected candidates shall be and continue to be subscribing corporate members of the Institution of Electrical Engineers. Housing accommodation may be available, if required, in a good neighbourhood, at an inclusive rent of £130 per annum. Forms of application may be obtained from the undersigned on receipt of a stamped addressed foolscap envelope, and completed applications must arrive not later than 18 Mar., 1955.

W. S. Chevalier, Clerk of the Board. Offices of the Board, New River Head, Rosebery Ave, London, E.C.1. (R 21)

EASTERN ELECTRICITY BOARD
Chilterns Sub-Area

TWO GENERAL ASSISTANT ENGINEERS—AYLESBURY DISTRICT

30/55 R.

CANDIDATES should have had a sound training in Electrical Engineering and experience in the construction, operation and maintenance of underground and overhead systems, including substations

The salary will be in accordance with Class E, Grade 11, of the National Joint Board Agreement commencing at £555 and future salary and conditions of service will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidate will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Applications by letter, stating age, education, qualifications and experience with details of present appointment and salary, should be submitted to the District Manager, Aylesbury, Eastern Electricity Board, Exchange St, Aylesbury, Bucks, within fourteen days of the appearance of this advertisement. (R 104)

BRITISH ELECTRICITY AUTHORITY
East Midlands Division

APPLICATIONS are invited for the following positions within the Division:

SECTION LEADER (CIVIL) GENERATION (CONSTRUCTION) DIV. H.Q.

Vacancy No. 38/55/ET

Candidates should be capable of taking charge of a Civil Section in the Generation (Construction) Drawing Office, and should have experience in the design and detail of heavy reinforced concrete structures, heavy foundations, retaining walls, culverts, etc.

Preference will be given to candidates holding qualifications equivalent to Corporate Membership of the Institution of Civil Engineers.

Salary will be in accordance with Schedule D, Grade 3 (£860 x £20—£960 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 14 Mar., 1955.

WAYLEAVE OFFICER DIVISIONAL HEADQUARTERS

Vacancy No. 35/55/ET

Candidates should be of good education and have experience of negotiating with owners of property to arrange Wayleaves connected with the erection of overhead transmission lines, settlement of damage to crops, etc., during erection of lines.

Experience in negotiating tree felling and valuation desirable.

The successful applicant will be required to provide a car for this appointment for which appropriate allowance will be made.

Salary will be in accordance with Grade 3 (£585/£645 per annum) of the National Joint Council Agreement.

Closing date for receipt of applications, 14 Mar., 1955.

SENIOR DRAUGHTSMAN, TRANSMISSION DEPARTMENT DIVISIONAL HEADQUARTERS

Vacancy No. 39/55/ET

Previous experience on the design and Construction of H.V. Substations, Overhead Transmission Lines or Cable Systems preferred, but is not essential.

Salary will be in accordance with Schedule D, Grade 5 (£640 x £20—£740 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 14 Mar., 1955.

JUNIOR ENGINEERS, FREEMEN'S MEADOW POWER STATION, LEICESTER

Vacancy No. 40 55/ET

Some experience in Control Room and Boiler House work in a laree P.F. Station is required. Technical qualifications up to H.N.C.

Salary in accordance with Class H, Grade 16 (£475 x £15—£520 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 21 Mar., 1955.

JUNIOR ENGINEER WARWICK POWER STATION

Vacancy No. 41/55/ET

Applicants should have had training and experience in Power Station operation and hold some qualification.

continued in next column

continued from previous column

Salary will be in accordance with Class E, Grade 13 (£475 x £15—£520 per annum) of the National Joint Board Agreement.

Closing date for receipt of applications, 21 Mar., 1955.

These appointments will be pensionable within the terms and provisions of the British Electricity Authority and Area Boards Superannuation Scheme.

Applications should be submitted on the official form A.E.6/ACT which may be obtained from the Divisional Establishments Officer, British Electricity Authority, P.O. Box 25, Barker Gate, Nottingham, and should be returned to the undersigned by the date stated. Please quote Vacancy Number.

L. F. JEFFREY, Divisional Controller. (R 103)

BRITISH ELECTRICITY AUTHORITY
Eastern Division

APPLICATIONS are invited for the following posts:

STATION SHIFT CONTROL ENGINEERS GOLDINGTON GENERATING STATION NEAR BEDFORD

Salary: Class G, Grade 10, £675 x £15—£720 per annum, eventually rising to Class H.

Applicants should have reached the standard of Ordinary National Certificate in Electrical Engineering or its equivalent, have experience in the operation of a Switchboard at a Generating Station and be fully conversant with High Voltage Switching operations and protective systems.

The Station, at present under construction, will comprise six unitised turbo-alternators and P.F. Boilers, each of 30 MW capacity.

Applications stating age, details of qualifications and experience should be addressed to the Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, not later than 12 Mar., 1955.

W. N. C. CLINCH, Controller. (R 69)

BRITISH ELECTRICITY AUTHORITY
Southern Division

APPLICATIONS are invited for the following posts:

SHIFT CHARGE ENGINEER, PORTSMOUTH GENERATING STATION

S/13.627

Applicants should have had previous experience in a large modern generating station, and preferably have had manufacturing works experience. They should preferably possess technical qualifications admitting to corporate membership of a recognised professional engineering institution.

Salary N.J.B. G.7, £790 x £20—£850.

SHIFT CONTROL ENGINEER, PORTSMOUTH GENERATING STATION

S/13.628

Applicants should have experience of the operation of a modern generating station, have had a sound technical training, and should preferably possess qualifications leading to corporate membership of an appropriate professional institution.

Salary N.J.B. G.10, £675 x £15—£720.

ENGINEERING DRAUGHTSMAN (ELECTRICAL) CONSTRUCTION DEPARTMENT, DIVISIONAL HEADQUARTERS, PORTSMOUTH

S/13.629

Applicants should have had experience of the layout of switchgear cables and lighting in connection with power station construction. Experience in schematic diagrams will be an advantage. Candidates should have had a good technical education in electrical engineering.

Salary N.J.B. D/6, £510 x £20—£630.

STATION CHIEF CLERK, EARLEY GENERATING STATION, READING

S/13.630

Applicants should have had considerable experience in the administrative and clerical work at a large generating station, including the preparation of wages sheets, stores records, and station costs. Candidates should have had a sound general education and preference will be given to those in possession of a recognised professional

continued in next column

continued from previous column

qualification, or equivalent.

Accommodation may be available for the successful applicant.

Those who recently applied for the similar post at Marchwood need not re-apply, but will be considered if they so request in writing.

Salary N.J.C. Grade 5, £720 x £25—£795.

Special application forms for each of the above posts, obtainable from P. D. A. Oliver, Divisional Secretary, 111 High St, Portsmouth, should be returned by 21 Mar. Please quote reference E.T. (R 120)

IMPERIAL CHEMICAL INDUSTRIES LIMITED
Wilton Works

ENGINEERS

FEW postwar industrial developments have been conceived on the scale of continuous expansion of the Wilton Works of Imperial Chemical Industries.

This modern factory provides opportunity for young men of ability in many fields of engineering. Previous experience in the chemical industry is not essential but applicants should have one or more years' industrial experience including practical training, and men with a good Honours Degree are preferred. There are openings in most engineering fields including design and layout, construction, plant operation and maintenance for Mechanical and Electrical Engineers, who will find ample scope for promotion leading to executive positions.

Appointments are to the permanent staff with first-class working conditions including Pension Fund and Recreation facilities.

Write for application form to Staff Officer, Imperial Chemical Industries Ltd., Wilton Works, Middlesbrough, Yorkshire, quoting advertisement ref. ICI/X/204/C. (R 50)

BRITISH ELECTRICITY AUTHORITY
South Eastern Division

1. SECOND ASSISTANT STATION CHEMIST—LITTLEBROOK POWER STATION

APPLICANTS should preferably possess a B.SC. degree or equivalent qualification and have had experience in fuel testing, water analysis and lubricating oil testing. Experience of modern Power Station installations an advantage. Class L, Grade 11, £790/£850 per annum plus 5% London allowance.

2. JUNIOR ENGINEER (CHEMIST)—BRIGHTON "A" AND "B" POWER STATIONS

Applicants should possess O.N.C. (Chemistry) or equivalent qualification and possess a sound knowledge of elementary chemistry. Class L, Grade 19, £475/£520 per annum.

Divisional Headquarters Staff

3. SECOND ASSISTANT ENGINEER (METERING) (BASED AT CROYDON "B" POWER STATION)

Applicants should preferably possess a Higher National Certificate or equivalent qualification and have had wide experience in application and maintenance of impulse summation metering systems and polyphase meter testing and standardising. Knowledge of Power Station steam instrumentation an advantage. Class AX/DX, Grade 2, £950/£1,075/£1.165 plus 5% London allowance.

4. SENIOR ASSISTANT ENGINEER (based at Kingston) to assist the Divisional Transmission Engineer on all matters relative to the Transmission Dept. Applicants should have had extensive experience in the Maintenance, Operation and Construction of E.H.V. equipment on a large Power System and be familiar with Consultative and Conciliation machinery. Membership of one of the recognised professional Institutions would be an advantage. Grade 1, Class AX/DX, £1,100/£1,225/£1,315 per annum plus London Allowance.

N.J.B. Conditions of Service for all positions.

Applications giving details of education, present position, experience, etc., should be received by the following according to location of vacancy: 1, Station Superintendent, Littlebrook Power Station, Nr. Dartford, Kent, 2, Station Superintendent, Brighton Power Station, Portslade-by-Sea, Sussex, 3 and 4, Establishments Officer, British Electricity House, Lower Ham Rd, Kingston-on-Thames, Surrey. Closing date 17 Mar., 1955. (R 112)

United Kingdom Atomic Energy Authority

Aldermaston

requires a TECHNICIAN to be responsible to a Senior Engineer for the efficient operation of a group of workshops engaged on the manufacture of a wide range of experimental electronic equipment. Applicants should have served a recognised engineering apprenticeship. Previous experience in both mechanical precision instruments (e.g., light machining, fitting and sheet metal work) and electronic work (e.g., wiring and assembly, transformer winding) associated with the small quantity production of electronic equipment, is essential. Previous experience with plastics as applied to electronic work would be an advantage. Possession of Higher National Certificate or equivalent qualification is desirable. Salary: £830 to £1,015 (male). The successful candidate will be required to join the Authority's Superannuation Scheme and contribute 6% of salary. Housing will be available within a reasonable period of time for the selected candidate who is married and lives outside the radius of the Establishment's transport facilities. During this period, lodging allowance may be payable to suitably qualified candidates. Application forms from

SENIOR RECRUITMENT OFFICER, A.W.R.E., Aldermaston, Berks, quoting reference 528/WGE/49.

(P 49p)

YORKSHIRE ELECTRICITY BOARD

No. 6 (Hull) Sub-Area

Goole District

DISTRICT COMMERCIAL ENGINEER

APPLICANTS must be experienced in all matters connected with the Commercial Organisation of the Electricity Supply Industry, i.e. experience in negotiations with large Power, Agricultural and Domestic Consumers; load development, electrical contracting, preparation of statistics and reports, control of staff, etc.

Preference will be given to candidates who are members of the Institution of Electrical Engineers, or hold equivalent qualifications.

The successful candidate will be required to live in or near Goole.

Salary—N.J.B. Class E, Grade 4, £840/£20/£900 per annum.

Applications, giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Manager, No. 6 (Hull) Sub-Area, Yorkshire Electricity Board, Ferensway, Kingston-upon-Hull, not later than 17 Mar., 1955.

No. 5 (Wakefield) Sub-Area

Barnsley District

GENERAL ASSISTANT DISTRICT ENGINEER

Applicants must have had a sound practical training with experience in the construction, operation and maintenance of H.V. and M.V. overhead and underground distribution networks, substation plant and ancillary equipment.

Applicants must hold a current driving licence, be prepared to reside in the district and undertake standby duties.

Applicants must hold at least the Higher National Certificate in Electrical Engineering.

Salary—N.J.B. Class F, Grade 11, £595/£15/£640 per annum.

Applications, giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Manager, No. 5 (Wakefield) Sub-Area, Yorkshire Electricity Board, 1a Denby Dale Rd, Wakefield, not later than 17 Mar., 1955.

No. 7 (Grimsby) Sub-Area

Grimsby District

LINESMEN (Overhead Power) (Up to 60,000 V). Required for 33 kV Overhead Line construction work.

N.J.I.C. rate of pay and conditions of service, the present rate being 3s. 11d. per hour for a 44-hour, 5-day week.

Applications, giving full details of age, training and experience, should be forwarded to the Manager, No. 7 (Grimsby) Sub-Area, Yorkshire Electricity Board, Moss Rd, Grimsby, not later than 17 Mar., 1955.

(R 80)

Box No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London, W.C.2

INSPECTOR OF WORKS (Electrical)

required by the FEDERAL GOVERNMENT OF NIGERIA for the Public Works Department, for one tour of 12 to 24 months either (*a*) on agreement with prospect of permanent and pensionable employment, or (*b*) on contract terms. Salary scale (including expatriation pay) under terms (*a*) £750 rising to £1,035 a year or under terms (*b*) £807 rising to £1,115 a year with gratuity at rate of £100/£150 a year. Commencing salary according to war service and approved experience. Outfit allowance £60. Free passages for officer and wife. Assistance towards cost of children's passages or grant up to £150 a year for their maintenance in U.K. Candidates should have served an apprenticeship and have had 5 years' experience in electrical contracting work. Possession of a C. and G. Certificate in Electrical Installation Work will be an advantage and a knowledge of the electrical maintenance of air conditioning and oil engine standby generating plant desirable. Write to the Crown Agents, 4 Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M2A/40391/EE. (R 84)

BRITISH ELECTRICITY AUTHORITY

South Wales Division

Vacancy No. 22/55

APPLICATIONS are invited for superannuable N.J.B. appointments of GENERAL ASSISTANT ENGINEERS—Technical Department, Divisional Headquarters. Salary AX/DX6—£600/£785 per annum. H.N.C. or equivalent qualifications desirable.

GENERAL SECTION

Commissioning, maintenance and fault investigation of protective gear and electrical plant in generating stations and 132 kV substations.

SYSTEM DEVELOPMENT SECTION

Assist in design of 132 kV transmission system and investigation of a wide range of system problems.

MEASUREMENT SECTION

Applicants should be familiar with the use of potentiometer equipment and standardisation of indicating instruments; experience in calibration of electrical instruments and polyphase integrating meters.

Application forms obtainable from Secretary, South Wales Division, British Electricity Authority, Twyn-y-Fedwen Rd, Gabalfa, Cardiff, to be returned by 14 Mar., 1955. (R 85)

ASSISTANT ENGINEER (25-30 years) required for contract work in Edinburgh office of consulting engineers. The work is associated with large distribution schemes in Scotland. Applications setting out technical training and details of experience on distribution work should be sent to Kennedy and Donkin, 3 North Charlotte St, Edinburgh 2. (R 86)

A MAJOR manufacturer of Electric Storage Batteries has vacancies for a YOUNG ELECTRICAL ENGINEER and a YOUNG CHEMIST at their works at Dagenham, Essex. B.SC. Degree esscntial, some industrial experience, though not necessarily on batteries, an advantage. The posts offer excellent prospects in an extremely interesting field, the scope of which includes Electrical Engineering, Electro Chemistry and Plastics Technology. A generous commencing salary would be paid in accordance with age and experience. Accommodation in the district for a married man is not easily found unless he is prepared to buy a house. Please send details of age, education and experience to Personnel Manager, Pritchett and Gold. (R 117)

A MALE ASSISTANT is required for the Trade Counter of our Wholesale Electrical Dept. Apply: The Secretary, Gibbs and Dandy Limited, 26 Chapel Street, Luton, Beds. (R 90)

AIR CONDITIONING ENGINEER with previous experience required for permanent post in Nigeria. Applicants must be capable of supervising installation and maintenance of equipment as well as having some costing knowledge if possible. Single man preferred. Accommodation provided. Usual overseas leave arrangements. Write giving age, qualifications and experience to —Box No. 4315, Electrical Times. (R 109)

AN ASSISTANT ENGINEER required. Must be able to prepare schemes, specifications and estimates for electrical installations in industrial and other buildings. Must also possess a good knowledge of design, L.T. distribution—internal and external, and switchgear up to and including 11 kV. Apply stating full particulars to Christy Bros. Ltd., 171 Broomfield Rd, Chelmsford, Essex. (R 70)

AN ELECTRICAL DESIGNER of rotating electrical machines required. It is essential that applicants have comprehensive experience in the design of high-freqeuency inductor alternators up to 1,000 kW for furnace heating. Salary commensurate with qualifications; good prospects. Apply to The Chief Engineer, Lancashire Dynamo and Crypto Ltd., Trafford Park, Manchester 17. (R 46)

AN EXPERIENCED D.C. DESIGNER capable of using his initiative required for interesting work on dynamo electric machines from 5 to 5,000 h.p./kW. A superannuation scheme in operation and the usual social amenities available in an organisation of progressive outlook. All applications will be treated with the strictest confidence and should be addressed to the General Manager, Lancashire Dynamo and Cryto Ltd., Trafford Park, Manchester 17. (R 95)

DOMESTIC APPLIANCE ENGINEERS

The English Electric Company has always been eager to expand its Domestic Appliance Division. The first step in such a plan is the expansion of the Engineering Department by promotion from within the Company. In addition the Chief Engineer SEEKS TO RECRUIT TWO OR THREE WELL QUALIFIED AND EXPERIENCED ENGINEERS to act as spearheads for this expansion at the Liverpool Works.

The appointments carry complete responsibility for the design and development of entirely new appliances. In addition to technical qualifications successful applicants must possess in full measure the qualities of management (initiative, drive and leadership) so that they may be eligible for consideration, as expansion proceeds, for the highest managerial positions in the division. Reply to Dept. C.P.S., 336/7 Strand, W.C.2, quoting Ref. 452M. (R 60p)

THE ENGLISH ELECTRIC COMPANY LIMITED

Stevenage, Hertfordshire

are seeking the services of

a fully qualified

SENIOR ENGINEER

He will be required to head a team of development engineers engaged on the development of hydraulic equipment and servo systems.

The successful applicant must have appropriate membership of the professional institutions, preferably with a degree together with considerable experience in leading a team of development engineers and drawing office staff.

This post offers excellent opportunities together with housing assistance and excellent salary. Please apply, quoting Ref. No. 844L, to Dept. C.P.S., 336/7 Strand, W.C.2. (R 53p)

BRUSH ELECTRICAL ENGINEERING COMPANY LTD., have vacancies for men of ambition seeking progressive and responsible positions as TENDERING and CONTRACTS ENGINEERS in their Commercial Departments at Loughborough. Applicants should be capable correspondents with experience in one or more of the following: turbo - alternators, rotating machines, switchgear or transformers. Additionally, vacancies exist in the General Engineering Division for men having specialised knowledge of comprehensive power schemes for both diesel and steam generating stations. Appointments will be of a permanent nature with good salaries, and excellent prospects are open to suitable men. Conditions of service include non-contributory staff assurance. Please write with full details in confidence to the Chief Personnel Officer, Brush Electrical Engineering Co., Ltd., Loughborough. Candidates who may wish to obtain further information before making official applications can do so by making contact with our various Branch Managers, located at Glasgow, Manchester, Aberdeen, Birmingham, Bristol, Cardiff, Ipswich, Leeds, London, Newcastle and Sheffield. (R 94)

BULL MOTORS invite applications from qualified SALES ENGINEERS for an appointment in London. Experience of motor application essential. Full details of qualifications, experience and salary required should be addressed to Sales Director, Bull Motors, Foxhall Works, Ipswich. (R 36)

CHIEF PRODUCTION ENGINEER

A prominent manufacturer desires to appoint a Chief Production Engineer with experience of electric lamp or valve manufacture. The position calls for a person having considerable experience in Lamp making machinery and manufacturing methods. Prospects are excellent. A first rate salary will be paid to the right man and the position is fully superannuated. Own staff are aware of the vacancy. Applications in full detail to—Box No. 4323, Electrical Times. (R 119p)

BRANCH MANAGER required by well-known London firm of electrical engineers. Knowledge of electrical installation and motor repairs essential.—Box No. 4295, Electrical Times. (R 40)

CONTRACT ENGINEERS required by Cable Maker with headquarters in London. Applicants should preferably have Ordinary National Certificate and must have had good experience in the installation of all types of power cables. A knowledge of overhead line construction would be an advantage. Write—Box No. 4307, Electrical Times. (R 74)

DESIGNER/DRAUGHTSMAN required for design and development of test gear to meet production demands of Thermionic Valves and Cathode Ray Tubes. Applicants should have good mechanical knowledge, with previous experience in mechanical and electrical interlocks, component layouts for Power Supply Units up to 50 kV 50 cycles and R.F. or Induction Heaters. Housing facilities available near factory area. Write stating age and full details of previous experience and technical training to The Edison Swan Electric Co., Ltd., Eastern Industrial Area, Harlow New Town, Essex. (R 57)

DRAUGHTSMAN required for detailing mechanical and electrical assemblies. Must be capable of reading electronic circuits. Applicants with any previous experience on Sheet Metal Cubicles, H.V. Power Supply Units, Induction Heaters or Radio and Television layouts should write stating age and full details of previous experience and technical training. Housing facilities available near factory area. The Edison Swan Electric Co., Ltd., Eastern Industrial Area, Harlow New Town, Essex. (R 58)

DRAUGHTSMEN: (1) ELECTRICAL LAYOUT DRAUGHTSMAN required by Consulting Engineers for work in connection with E.H.T. outdoor switching and transforming substations at their Weybridge Office. Minimum technical qualifications, H.N.C. or equivalent and suitable experience with a leading switchgear or transformer manufacturer. (2) JUNIOR DRAUGHTSMAN required to assist on the above work. Applications giving full particulars of experience, age and salary required to Kennedy and Donkin (ref.: HPC), Holme Chase, St. Georges Ave, Weybridge, Surrey. (R 72)

DRAUGHTSMAN required in London Office of Leading Oil Company to detail pipework and ducting layouts for heating and ventilating and general engineering plant in industrial and other buildings. Age 21 to 30 years. Good practical experience followed by at least two years in the drawing office. Preference given to man holding Ordinary National Certificate. Draughtsman will be expected to spend periods of temporary duty, if and when required, at refineries in the U.K. and abroad. Salary according to age, qualifications and experience. Good Pension Scheme. Write giving full details and quoting H.3286 to Box 7318 c/o 191 Gresham Hse, E.C.2. (R 73)

ELECTRICIAN required by London Electricity Board in Bethnal Green District of Northern Sub-Area. N.J.I.C. rates of pay and conditions of service—4s. 5d. per hour. Application forms from Personnel Officer, 46/7 New Broad St, E.C.2. Please enclose addressed envelope and quote ref.: M/3776/T. (R 87)

ENFIELD CABLES LTD. urgently require OVERHEAD LINESMEN, used to work on 33 kV lines for a contract at Peterborough. Write giving full details to the Contracts Dept., L.A.D., Stockingwater Lane, Brimsdown, Middx. (R 51)

ENGINEERS required with experience in Works manufacturing Turbines, Generators and Motors. Knowledge of estimating or purchasing an advantage. Age preferably between 30 and 45. Applications, which will be treated in strictest confidence, stating age, technical training, experience and present salary, to: Mr R. Briggs, B.E.A.M.A., 36 Kingsway, London, W.C.2. (R 33)

A SENIOR ENGINEER

is required immediately by an internationally known Electrical Engineering Company situated near London, to lead a large team of development and design engineers engaged on the complete development of servo systems, hydraulic equipment and electro-mechanical apparatus.

Applications are invited from suitable engineers, fully experienced in controlling a team of development engineers and drawing office personnel, and having a good knowledge of the routine work of a development laboratory. Membership of the Electrical or Mechanical Institute coupled with an engineering degree, is considered essential for this appointment. A salary of up to £1,500 will be paid to the successful applicant and housing assistance will be given if required.

Applications, which will be considered strictly confidential, giving full details of experience and qualifications, etc., should be addressed to

Box No. 4297
Electrical Times (R 61p)

ELECTRICAL ENGINEER, graduate or H.N.C. essential, required for quality supervision of paper insulated power cables up to the highest voltages. Previous experience of manufacturing processes desirable and must be exempt from National Service. Age limit 25/35. Reply stating full details of technical background to B.I.C. (Submarine Cables) Ltd., c/o The Secretary, W. T. Glover and Co., Ltd., Trafford Park, Manchester 17. (R 32)

ELECTRICAL ENGINEER with degree required for position in Technical and Testing Departments of large Telecommunication Cable Works in London area. Position permanent and pensionable with good prospects of advancement. Apply with full details to—Box No. 4283, Electrical Times. (R 31)

ELECTRICAL ESTIMATOR required for service in Liverpool area with experience on the preparation of estimates and specifications for electrical installation contracts. Experience on O.H. and U.G. transmission an advantage but not essential. Commencing salary £600 per year plus allowances. Apply giving details of age, qualifications and experience to—Box No. 4305, Electrical Times. (R 65)

ENGINEER with electrical or physicist degree required for development work on testing equipment for telecommunication cables. Permanent and pensionable position at salary commensurate with experience and qualifications. Please apply giving full particulars to Personnel Officer, Southern United Telephone Cables Ltd., Dagenham Dock, Essex. (R 54)

CHIEF PRODUCTION ENGINEER

A leading Electric Cable Manufacturer wishes to appoint a Chief Production Engineer with good experience of cable-making plant and processes for paper, rubber and thermo-plastic products. A first rate salary will be paid, prospects are high and post is superannuated. Detailed applications, quoting Ref. "Cables," to—Box No. 4321, Electrical Times. (R 118p)

A limited number of interesting electrical engineering vacancies are being created at a new division of the ENGLISH ELECTRIC COMPANY LTD., at STEVENAGE, HERTFORDSHIRE. These offer excellent opportunities to progress in the electronic/mechanical field. Applications are invited from suitably qualified men to fill the following appointments:

(1) SENIOR ENGINEERS to be engaged on the design of electro-mechanical apparatus and hydraulic equipment used in functional acceptance tests for electro-mechanical gear. Suitable applicants must have a B.SC. in electrical engineering or H.N.C. and considerable experience in the design of electro-mechanical equipment, and preferably experience in servo systems and/or hydraulic equipment.

(2) DESIGN ENGINEERS for similar work. These applicants must have experience in the handling of project and design teams and in drawing office direction. Main qualifications required are at least O.N.C. and some experience in electronic or hydraulic electrical equipments.

(3) SENIOR DRAUGHTSMAN to lead and direct team in the design and development of light mechanical instruments and electro-mechanical systems. Applicants must be fully experienced in similar work and capable of directing and co-ordinating a small drawing office team.

(4) DRAUGHTSMEN. These are progressive vacancies available to fully qualified draughtsmen capable of becoming members of the above design teams.

Housing assistance can be given in many cases, particularly for applicants from the Greater London Area. Interviews in London or at Stevenage or Luton by arrangement. The initial applications, giving full details of experience and qualifications and stating clearly the appropriate vacancies, should be sent to Dept. C.P.S., 336/7 Strand, W.C.2, quoting Ref. S.A. 23E. (R 52p)

EXPERIENCED ENGINEERS required for the erection of lattice tower and wood pole Overhead Transmission Lines and willing to serve either at home or overseas. Applicants should have a technical background up to Higher National Certificate (Electrical) standard. Pension Fund. Apply in writing stating age, experience, qualifications, salary required and quoting reference C/77/55 to Staff Officer, British Insulated Callender's Construction Company Limited, 30 Leicester Square, London, W.C.2. (R 28)

FOREMAN LINESMAN and LINESMEN wanted. Overhead Line erection in N.E. and N.W. England. Must be fully experienced. Enfield Cables Ltd., St. Annes Yard, Breamish St, Newcastle-upon-Tyne, 1. (R 55)

DEVELOPMENT ENGINEERS

FERRANTI LTD. (Meter (Dept.), Hollinwood, Lancs, have the following vacancies: DEVELOPMENT ENGINEERS of approximately graduate status in Electrical Engineering or Physics. The work involves a variety of electrical and electromechanical problems arising in the design and development of electrical measuring devices with emphasis on integrating electricity meters. Reference M.D.E. Permanent staff appointments with pension benefits.

Application form from:

Mr T. J. Lunt, Staff Manager,
Ferranti Ltd., Hollinwood, Lancs.

Please quote reference (R 108p)

ELECTRICAL ENGINEER required for Electrical Department of Works in the North East. He should have a sound practical training, drawing office experience, knowledge of motor control gear resistance calculations, and preferably some experience of electrical heating for industrial applications. Apply giving full details of experience, technical qualifications, age, whether married or single, and salary required, to—Box No. 4299, Electrical Times. (R 62)

GRADUATES of universities or professional institutions in engineering or physics required for research in high frequency, light current engineering, use of electrical equipment in inflammable atmospheres, electrical space and water heating. Permanent employment qualifies for F.S.S.U. or equivalent pension scheme. Starting salary £500/£750 according to qualifications. Applications to be addressed to the Director, Electrical Research Association, 5 Wadsworth Rd, Greenford, Middlesex. (R 92)

ILFORD LIMITED require SENIOR ELECTRICAL DRAUGHTSMEN with sound experience in power wiring and layouts for process plant. Apply in writing to —Ilford Limited, Romford, Essex. (R 38)

JOINTER required in Stepney/Bethnal Green District of London Electricity Board. N.J.I.C. rates and conditions—4s. 3d. per hour. Application forms from Personnel Officer, 46/7 New Broad St, E.C.2. Please enclose addressed envelope and quote ref.: M/3812/T. (R 56)

JUNIOR DEVELOPMENT ENGINEER (Graduate) is required for work on the development of applications of tape recorders at a salary between £500/£650 depending on qualifications and experience. Write full details and quote reference CJBM to Communications Division, Southern Instruments Ltd., Camberley, Surrey. (R 35)

JUNIOR RESEARCH ENGINEER. The Lamp and Lighting Division of the Research Laboratory has a vacancy for a young man with a degree, H.N.C., or equivalent qualifications in electrical engineering or physics, for investigations into the performance of discharge lamp circuits and field operational problems. Please write, giving full particulars, to the Director of Research, The British Thomson-Houston Co., Ltd., Rugby, quoting reference MVR. (R 37)

LEADING Electric Cooker Manufacturer requires JUNIOR TECHNICAL REPRESENTATIVE for Scotland. Experience in selling in this field necessary. Good salary and motor car available also Staff Pension Scheme. Give full particulars with present salary to—Box No. 4301, Electrical Times. (R 63)

NETTLE ACCESSORIES LIMITED, Harper Rd, Wythenshawe, require person to SUPERVISE export department and assist sales manager. Salary according to experience and ability. Apply in own handwriting to Managing Director. (P 100)

PROTECTION ENGINEER required by The Steel Company of Wales Limited (Steel Division), Port Talbot, in their Electrical Distribution Department.

The successful candidate will be responsible for the setting up and maintenance of a large protective system including specialised testing within the department.

Higher National Certificate desirable and previous experience in design and commissioning of protective systems essential.

The position is permanent and pensionable.

Those wishing to apply should write for official Application Form to the Personnel Superintendent, The Steel Company of Wales Limited, P.O. Box No. 3, Port Talbot, Glam. (R 29)

SALES REPRESENTATIVE required by C.M.A. manufacturers to cover W. and N.W. districts of London. Salary—bonus—expenses. Write giving details of experience, whether car owner, and salary required, to—Box No. 4319, Electrical Times (R 115)

ELECTRICAL DRAUGHTSMAN

required by The Steel Company of Wales Limited (Steel Division), Port Talbot, in their Engineering Drawing Offices.

Highest rates. Permanent positions. Attractive Pension Scheme.

Those wishing to apply should send full particulars of age, qualifications, experience, etc., to the:

Personnel Superintendent
THE STEEL COMPANY OF WALES LIMITED
(Steel Division)
P.O. Box No. 3, Port Talbot, Glam.
(R 59p)

REPRESENTATIVE required by leading manufacturer of electrical accessories to cover Southern Electricity Board area. Applicants should have good contacts with wholesalers, contractors and architects. This is a permanent progressive position with superannuation and a first-class opportunity for the right man. Apply in own handwriting to Sales Manager, M.K. Electric Ltd., Wakefield St, N.18. (R 34)

SENIOR and DETAIL DRAUGHTSMAN required to work on design and detail of electric switches and devices, plastic/porcelain mouldings, presswork, etc.

A.E.S.D. minimum, but good salary paid to experienced men.

Holiday arrangements honoured. 5-day week, Canteen. West London Area. Saturday morning interviews arranged. Write giving details of experience and salary required to—Box No. 4303, Electrical Times. (R 64)

SENIOR ESTIMATOR required with initiative and having experience in handling comprehensive enquiries involving rotating electrical machinery up to 5,000 h.p./kW. A superannuation scheme in operation and the usual social amenities available in an organisation of progressive outlook. Promotions inside, and transfers to Sales normally made from Staff. All applicants will be treated with the strictest confidence and should be addressed to the General Manager, Lancashire Dynamo and Crypto Ltd., Trafford Park, Manchester 17. (R 71)

TECHNICAL MANAGER required by Company employed in the manufacture of rubber and thermoplastic cables. Applicants should preferably be graduates in Electrical Engineering or Physics or hold equivalent qualifications, and should have previous experience in the electrical cable industry. Applications, stating age, qualifications, experience and salary required to be addressed to: Personnel Officer, St. Helens Cable and Rubber Co., Ltd., Trading Estate, Slough, Bucks. (R 99)

TRANSFORMER DESIGN ENGINEER required to take charge of small design office. Applicant should be fully conversant with and have considerable experience in the design and manufacture of Power transformers up to 66 kV. Situation West London. The position is progressive, pension scheme available. Applicants should state age, experience, qualifications and salary required.—Box No. 4181, Electrical Times. (R 45)

VENNER LIMITED

require

(*a*) ELECTRONIC ENGINEER/LABORATORY ASSISTANT with experience in design and manufacture of low-power transmitters, receivers, etc.

(*b*) ELECTRICAL ENGINEER/LABORATORY ASSISTANT with experience in development of small generators, etc.

Salaries and conditions for these Staff vacancies are attractive, and there is a Pension Scheme. Applications should be addressed to:

Personnel Manager,
VENNER LIMITED,
New Malden, Surrey.
(MALden 2442) (R 89p)

SIMPLEX ELECTRIC CO., LTD.

Creda Works, Blythe Bridge, Staffs

(*a*) TECHNICAL ENGINEER for Cooker Research and Design, age 25-35 years with degree in Engineering, Physics or General Science, and at least three years' experience of development of electric or gas cookers.

(*b*) TECHNICAL ENGINEER wanted for Design and Development of electrical heating equipment, age 30-40 years with degree in Engineering or Physics and at least three years' experience of electric space heating and cooker elements.

(*c*) SENIOR DRAUGHTSMAN for Domestic Electric Cooker design, age 25-40 years. Preferably H.N.C. qualifications with a period of works apprenticeship; good production engineering knowledge of press tool work, preferably with gas or electric domestic appliances essential.

(*d*) YOUNG GRADUATE for Domestic Appliance Research and Design, age 22-26 years with degree in Engineering or Physics, and preferably some industrial experience in an engineering works or development department.

(*e*) TEST ENGINEER, age 22-30 years, with H.N.C. qualifications in Electrical Engineering and some laboratory experience. Must be familiar with equipment and techniques of testing. Familiarity with electric and gas domestic appliances would be an advantage.

The above staff are required to augment the existing Development Department of the Simplex Electric Co., Ltd., Creda Works, Blythe Bridge, Staffs. Good salaries and prospects are offered, together with membership of Superannuation Schemes.

Would applicants please give full details of qualifications and experience, addressing their letters to: The Personnel Manager. (R 39p)

THE TELEGRAPH CONSTRUCTION AND MAINTENANCE CO., LTD., have the following vacancies:

1. CABLE ESTIMATOR. Educational standard G.C.E.

2. TECHNICAL ASSISTANTS (2) Duties will involve primarily assisting with research and development work in connection with high voltage polythene insulated power cable. National Certificate standard in Electrical Engineering.

3. TECHNICAL ASSISTANT. Should have an interest in development work on high frequency and communication cables and the associated measuring methods and testing equipment. Inter-B.Sc. standard

These posts are pensionable. Five-day week and all welfare facilities. Write details to: Personnel Manager, Telcon Works, Greenwich, S.E.10. (R 91)

DRAUGHTSMEN

JOHNSON AND PHILLIPS LIMITED

have vacancies in their Mechanical Engineering, Transformer, Switchgear, Junction Box and Outdoor Contract Department for experienced men.

These positions offer good prospects and carry a salary commensurate with experience. Applications giving age, training and experience to

Employment and Welfare Manager, JOHNSON AND PHILLIPS LTD., Victoria Works, Charlton, S.E.7. (R 88p)

TECHNICAL CORRESPONDENT required for preparation of tenders for and correspondence in connection with electric resistance and gas furnaces. Must have good education and engineering training. Furnace experience an advantage. Good salary and prospects in expanding organisation. Write stating experience and present salary to Personnel Officer (JMP), Birlec Limited, Tyburn Rd, Birmingham 24. (R 98)

TELECOMMUNICATIONS (LINE TRANSMISSION) ENGINEER required by large organisation in the North West to train for position in Technical Publicity Department.

Applicants should be aged 25-30 years, and should have a good education background with the ability to write clear concise English. A sound knowledge of modern telecommunications techniques, including coaxial and other multi-channel carrier telephone and telegraph systems, essential.

The position is on the established staff of the Company, with contributory Pension Fund, and usual staff conditions and amenities. Please write to Box No. 438, Dorland Advertising Ltd., 18/20 Regent St, London, S.W.1, giving details of age, qualifications and experience. (R 26)

TELECOMMUNICATIONS (RADIO TRANSMISSION) ENGINEER required by large organisation in the North West to train for position in Technical Publicity Department.

Applicants should be aged 25-30 years, and should have a good general educational background with the ability to write clear concise English. A sound knowledge of modern telecommunications techniques, including V.H.F. and U.H.F. multi-channel systems and frequency-shift signalling practices, essential.

The position is on the established staff of the Company, with contributory Pension Fund, and usual staff conditions and amenities. Please write to Box No. 434, Dorland Advertising Ltd., 18/20 Regent St, London, S.W.1, giving details of age, qualifications and experience. (R 25)

THE RESEARCH LABORATORIES of the General Electric Co., Ltd., North Wembley, have an opening for a GRADUATE ELECTRICAL ENGINEER for responsible and interesting work on the development of power rectifier equipments. Candidates must have completed National Service if under 26 years of age, and should have had experience in the design and operations of circuits capable of handling powers of a few hundred kilowatts. Apply in writing to the Staff Manager (Ref. RLO/17) giving full particulars of experience, qualifications and age. (R 30)

WHIPP AND BOURNE LTD. require DRAUGHTSMEN with experience of medium or high voltage switchgear. Apply with full details to Switchgear Works, Castleton, Rochdale, Lancs. (R 27)

APPOINTMENTS WANTED

ENGINEER A.M.I.E.E.—abroad since 1947, executive posts held—excellent references. Requires executive appointment U.K. or overseas. Manufacturer's works large machine test experience, power generation and plant utilisation, mining, industry.—Box No. 4309, Electrical Times. (R 75)

SALES REPRESENTATIVE (30) with 8 years L.T. electrical installation and 7 years speciality selling experience, requires selling position in Northern Counties. Good references and driving licence. Desiring change.—Box No. 4317, Electrical Times. (R 110)

BUSINESS OPPORTUNITIES

ELECTRICAL MANUFACTURING ENGINEERS welcome contract enquiries for light assembly work. Capacity for cellulose spraying and metal polishing. Write in confidence.—Box No. 4281, Electrical Times. (R 42)

ELECTRICAL MANUFACTURERS, with nationally established connection, require additional supplies of galvanised overhead transmission line steelwork and equipment, preferably on sole agency basis, to market in conjunction with existing lines. Details in confidence.—Box No. 4311, Electrical Times. (R 76)

MAIL ORDER FIRM welcomes enquiries from manufacturers of Competitive Electrical appliances for inclusion in Current Catalogue. Write—Box No. 4279, Electrical Times. (R 41)

WORK WANTED

A.C. and D.C. MOTOR REWINDS and REPAIRS. Prompt service fully guaranteed. Edgware 5566 (4 lines).—Service Electric Co., Ltd., Stanmore, Middx. (R 3)

ARMATURE REWINDING service to the trade. Vacuums, Drills, Grinders, Hood Dryers, Dental Motors. Vacuum cleaner and drill armatures replaced from stock 24-hour service. Every job guaranteed. All vacuum cleaner parts, hoses, etc., in stock for any make. Apex washer agitator shafts stocked.—Regam Electric Cleaner Service 95 Park Lane, Leeds 1. (R 4)

IMMEDIATE capacity available for all types of ELECTRICAL INSTRUMENT WINDINGS including Stator and Armatures, for fractional h.p. motors.

Also assembly work required—Geraghty Products Ltd., 44 Packington Rd, Acton, W.3. ACO 7306. (R 96)

LET US SOLVE YOUR BREAKDOWN PROBLEMS, repairs speedily carried out by experts. Collection and Delivery by our own transport. A. T. Robinson, Electrical Power Engineers, The Green, Southall, Middx. Southall 3494/5/6. (R 5)

PATENTS

THE proprietor of British Patent No. 568764, entitled "RECTIFYING ARRANGEMENT" offers same for license or otherwise to ensure practical working in Great Britain.

Inquiries to Singer, Stern and Carlberg, 14 E. Jackson Blvd, Chicago 4, Illinois, U.S.A. (R 43)

WANTED

WANTED, ROTARY CONVERTERS, any size.—Universal, 221 City Rd, London, E.C.1. (R 2)

WANTED, for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of secondhand machinery and plant for re-use.—W. and H. Cooper Ltd., 176 Brady St, Bethnal Green, E.1. (R 1)

FOR SALE

BRITISH ELECTRICITY AUTHORITY

London Division

OFFERS are invited for the purchase and removal from Fulham Generating Station of the following:

1—Ellis Stone and Terrazzo Floor Surfacing and POLISHING MACHINE, equipped with 3 h.p., 400 V, 3-phase, A.C. electric motor and accessories, also a number of renewal spares.

Permission to view and conditions of tender may be obtained from the Divisional Purchasing Officer, British Electricity Authority, London Division, Generation House, Gt. Portland St, W.1, not later than 10 Mar., 1955. (R 78)

REDUNDANT for disposal, large quantity of D.C. and P.P. ELECTRIC METERS, also Electric Meter components. Apply—Box No. 4313, Electrical Times. (R 79)

A.A. ELECTRICAL CO. for A.C.-D.C. MOTORS, switchgear, exhaust fans, hoists, reduction gears, new or reconditioned units.—Chi. 5105, 67 Rothschild Rd, W.4. (R 7)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

SALE BY TENDER

THE Merseyside and North Wales Electricity Board offers for sale as scrap 26 Distribution Transformers of various sizes and voltages and 2 Static Balancers.

20 of these transformers and the static balancers may be inspected at the Board's Depot at Legacy, Near Wrexham, from 7 to 11 Mar., 1955, inclusive. 6 transformers may be inspected during the same period at the Board's Central Stores, St. Helens Rd, Caernarvon.

Forms of Tender, obtainable from the Manager, No. 4 Sub-Area, Merseyside and North Wales Electricity Board, Electricity House, Rhostyllen, near Wrexham, must be forwarded through the post under cover of the label provided, so as to be received at Electricity House aforesaid not later than noon on Friday, 18 Mar., 1955.

The transformers and balancers are offered for sale individually or as a whole, and the Board do not bind themselves to accept the highest or any Tender and reserve the right to accept the whole or any part of any Tender.

M. M. PARKER,
Secretary. (R 93)

A.C. and D.C. MOTORS, GENERATORS from stock.—Service Electric Co., Ltd., Honeypot Lane, Stanmore, Middx. Edgware 5566-9. (R 8)

A HIGH VACUUM IMPREGNATION UNIT or single or batch coil impregnation service to R.I.C. specification 214 or individual requirements.—Blickvac, Hamilton Rd Works, Hamilton Rd, S.E.27. Tel. Gypsy Hill 4394. (R 13)

DON'T WORRY about your ELECTRICITY BILLS. Fit 1s. slot electric meters for hotels, bedsitters, etc. Prices from 50s. Selectrics Department E.T., Castle Circus House, Torquay. Phone 7218. Trade enquiries invited. Trade discount. (R 17)

ELECTRIC MOTORS, D.C. and A.C., Motor Generator Sets, Alternators and Dynamos. Reconditioned and guaranteed, very large stocks held.

Britannia Manufacturing Co., Ltd., Britannia Walk, N.1. CLErkenwell 3512-3-4. Stores at Chobham, Surrey. (R 15)

A.C. and D.C. MOTORS, all sizes, large stocks. Fully guaranteed.—Milo Engineering Works Ltd., Milo Rd, East Dulwich, S.E.22 (Forest Hill 2278-9). (R 6)

EIGHT 500 kVA TRANSFORMERS four Bruce Peebles and four B.E.T. all in good working condition, 3-phase, 50 cycle, oil-cooled ratio 5,000/415 with H.T. tappings.

Also 100 kVA Ferranti transformer, 3-phase, 50 cycle ratio 6,500/457 together with H.T. English Electric switchgear, comprising two T.P. link and transformer switches. Carreras Ltd., Electrical Department, Hampstead Rd, London, N.W.1. (P 47)

FLUORESCENT. 4 ft Batten 37s. 6d. (with tapped choke and starter, less tube) Daylight/Warm White tubes 5 ft, 7s. plus 1s. 9d.; 4 ft, 6s. 3d. plus 1s. 7d. Guaranteed. Bridisco (Dept. ET), 591 Green Lanes, London, N.8. (R 16)

HOUSE-SERVICE METERS, a.c. or d.c., quarterly or prepayment.—Universal Electrical, 221 City Rd, London, E.C.1. (R 9)

MERCURY SWITCHES are made by Hall, Drysdale and Co., Ltd., of 58 Commerce Rd, Wood Green, London, N.22. Tel.: BOW 7221. (R 10)

300 KVA Outdoor type Oil Immersed Naturally Cooled Distribution TRANSFORMERS. 3,300/440 V, 3-phase, 50 cycles. Connections H.V., Delta L.V., Star Symbol 41 Dyll. BSS. 171. H.V. Cable Box for 3 core to ·12 sq in. cable. L.V. Cable Box, 4 pole, 7 gland (6 glands for ·75 sq in. PILC cable and 1 gland for neutral ·5 sq in. PILC cable) Tappings on H.V. winding 2½% and 5% above and below normal voltage at no load. Externally operated off load tapping switch. Maker C. A. Parsons and Co., Ltd. Date of manufacture 1947. Unused and windings kept under oil and tested regularly. Apply—Box No. 4293, Electrical Times. (R 19)

FLAMEPROOF MOTORS, M.G. SETS, D.C. MOTORS, GEARED MOTORS, A.C. MOTORS, TRANSFORMERS, CONTROL GEAR. SPECIALS. FLANGE MOTORS

ELECTROPOWER COMPANY LIMITED

Kingsbury Works, Kingsbury Rd., London, N.W.9
Tel.: COLindale 4621/3
Grams: Lectropowa, Hyde, London (R 11p)

NEW CROMPTON PARKINSON 20 h.p. slip-ring, 3-phase, 365 V, 940 r.p.m. Crompton Oil Immersed Starter £100, 12 months' guarantee.

W. H. Shoebridge and Sons Ltd., Mounts, Northampton. (R 77)

PURLEY CHOKES AND BALLASTS Our 80-W tapped h.p.f. ballast with starter switchgear-holder incorporated is proving itself the most popular unit. Suitable for most fittings, 57s. 6d. each subject.—F. W. Blanshard Ltd. (Dept. E.T.), Purley, Surrey. Uplands 4818-9. (R 12)

TIME SWITCHES from stock. Reconditioned or new. 12 months' guarantee. Lists from J. W. Hughes, 3 St. Thomas St, London Bridge, S.E.1. Tel. Hop 2759. (R 14)

ONE — ENGLISH ELECTRIC PROTECTED TYPE CONTINUOUSLY RATED SLIP-RING INDUCTION MOTOR, having two endshields containing ball and/or roller type bearings, third pedestal bearing, bed-plate, and three slide rails.

Supply—200 V, 2-phase, 3-wire, 50 cycles.
Output—135 h.p.
Speed—1,320 r.p.m.
Frame size—AGS.10.

The motor built in accordance with standard practice, and designed to comply with B.S.S. 168.

CONTROL GEAR

The control gear is manufactured by Messrs Allen West and Co. This equipment comprises:

1—Air break stator contactor panel.
1—Type "PB2" "start," "stop" and "inch" push button switch.
1—Drum type air break rotor starter.
1—Separately mounted starting resistance.
1—Type "C" air-cooled rotor slip resistance.

A. E. Jenks and Cattell Ltd., Wednesfield, near Wolverhampton. (R 18)

MISCELLANEOUS

FREE! Brochure giving details of courses in Electrical Engineering and Electronics, covering A.M.BRIT.I.R.E., City and Guilds, etc., Moderate fees. Write to E.M.I. Institutes, Dept. ET. 29, London, W.4. (Associated with H.M.V.) (R 20)

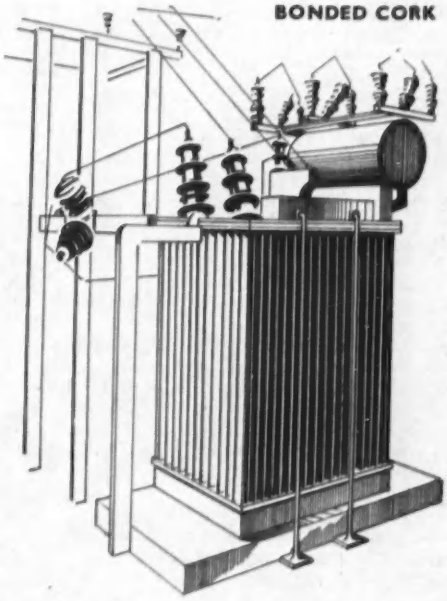
A Joint to forget Material to Remember

NEO-K-TEX

SYNTHETIC RUBBER BONDED CORK

- GASKETS
- WASHERS
- SHEETS
- MOULDINGS

RESISTANT TO OIL, PETROL, WATER AND MOST INDUSTRIAL SOLVENTS



KAUTEX LTD. ELSTREE WAY · ELSTREE · HERTS · Tel. ELSTREE 1777-8-9

INDEX TO ADVERTISERS

Aidas Electric Ltd. 60
Alumilite & Alzak Ltd. 40
Aluminium Union Ltd. 30
Aluminium Wire & Cable Co. Ltd. ... 21
Auchterlonie, Chas., & Co. Ltd. ... 66
Automatic Coil Winder & Electrical Equipment Co. Ltd. 38

Bill Switchgear Ltd. 3
British Electric Resistance Co. Ltd. ... 56
British Insulated Callender's Cables Ltd. Cover (i), 19
British Klockner Switchgear Ltd. ... 60
British National Electrics Ltd. ... Cover (ii)
British Thomson-Houston Co. Ltd ... 27
Brook Motors Ltd. 31
Brown, S. G., Ltd. 66
Brush Electrical Engineering Co. Ltd.... 37

Cable Makers Association 10
Cantie Switches Ltd. 34
Carter, B. & F., & Co. Ltd. 64
Channel Conduits Ltd. 18
Chilton Electric Products Ltd.... ... 4
Chloride Batteries Ltd. 12
Copper Development Association ... 62
Cox Walkers Ltd. 66
Critchley Bros. Ltd. 20
Crompton Parkinson Ltd. 63

D.P. Battery Co., Ltd. ... ...

East London Mica Works 24
Edison Swan Electric Co. Ltd. 13
Engineering & Lighting Equipment Co. Ltd. 26
English Electric Co. Ltd. 32
Everett Edgcumbe Ltd. 11
Evershed & Vignoles Ltd. 61

Ferranti Ltd. 25

Geipel, Wm., Ltd. 62
General Electric Co. Ltd. ... 7, 67
Gent & Co. Ltd. 57
Gilflex Conduits Ltd. 24

Hackbridge & Hewittic Electric Co. Ltd. 2
Hardy & Padmore Ltd. 8
Henley's, W. T., Telegraph Works Co. Ltd. 45
Hick Hargreaves & Co. Ltd. ... Cover (iv)
Holophane Ltd. 15
Hoover Ltd. 44

International Combustion Ltd. ... 33

Jackson Electric Stove Co. Ltd. 28, 29

Kautex Ltd. 55
Key Engineering Co. Ltd. 64

Laurence, Scott & Electromotors Ltd. 1
Liverpool Electric Cable Co. Ltd. ... 23
L.P.S. Electrical Co. Ltd. 14

Martindale Electric Co. Ltd. 20
Meritus (Barnet) Ltd. 66
Metal & Plastics Compacts Ltd. ... 22
Metallic Seamless Tube Co. Ltd. ... 4
Metropolitan-Vickers Electrical Co. Ltd. 5, 46
M.K. Electric Ltd. 65

P. & B. Engineering Co. Ltd. 18
Pitman, Sir Isaac, & Sons Ltd. 24
Premier Cooler & Engineering Co., Ltd. 8

Rawlplug Co. Ltd. 14
Revo Electric Co. Ltd. 6
Rotunda Ltd. 64

Sanders, Wm., & Co. (Wednesbury) Ltd. 68
Simplex Electric Co. Ltd. ... 36, 59
Smiths Industrial Instruments Ltd. ... 9
Sperryn & Co. Ltd. 20
Statter, J. G., & Co. Ltd. 62
Symonds, R. H., Ltd. 39

Transformer & Electrical Co. Ltd. ... 64
Transformers (Watford) Ltd. ... Cover (iii)

United Ebonite & Lorival Ltd.... ... 35

Ward, Thos. W., Ltd. 41
West Insulating Co. Ltd. 62
Westinghouse Brake & Signal Co. Ltd. 42
Wiggin, Henry, & Co. Ltd. 43
Woods of Colchester Ltd. 17
Wootton & Co. Ltd. 58
Worthington-Simpson Ltd. 40

Zenith Electric Co. Ltd. 58

7 ESSENTIALS for a PERFECT RESISTOR*

1 Perfectly even winding before and after firing.

Turns could easily become bunched during firing processes due to the surface tension of the molten enamel. Bunched windings would cause hotspots, burn-outs and breakdown of inter-turn insulation.

2 Moisture proof enamel and tube at all temperatures.

Cracks or pores in the tube or enamel would allow moisture to penetrate and cause corrosion, changes in resistance value and open circuits.

3 Enamel and tube must be good insulators at high temperatures of 300 to 400°C.

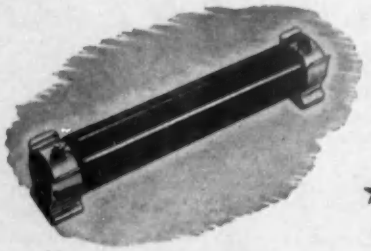
If the insulation resistance of the enamel or tube were to drop at high temperatures it would be necessary to impose a limit to the voltage which could be applied. This would reduce the permissible loading of units of high unit value, and increase the size or number of units required for a given duty.

4 Welded internal connections.

Imperfect internal connections would cause intermittent changes in resistance value and faults difficult to locate.

5 Enamel, tube and winding must be thoroughly annealed during firing.

Internal stresses in materials would be revealed as cracks in the surface of the enamel, cracked tubes or open circuits due to mechanical fracture of the fine wires.



6 Matched expansion coefficients of tube, wire and enamel.

The big operating temperature range of vitreous resistors would cause cracks in the ceramic materials or breakage of winding if stresses were set up due to unbalanced expansion coefficients.

7 The vitreous enamel must be chemically inert at temperatures up to 1,000°C.

Enamels which have a chemical action on the wire at high temperatures would cause eventual open circuits.

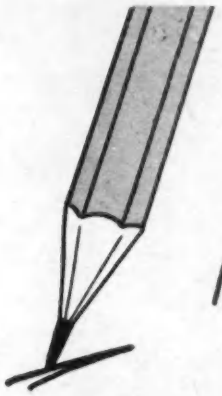
★*These seven features are incorporated in all BERCO vitreous enamelled resistors which are manufactured in a wide range of sizes and mountings.*

Write for Booklet L.611

BERCO VITREOUS ENAMELLED RESISTORS

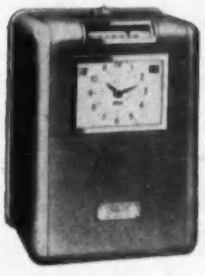
THE BRITISH ELECTRIC RESISTANCE CO. LTD.
QUEENSWAY, PONDERS END, MDX. Tel: Howard 1492. Grams: Vitrohm, Enfield.

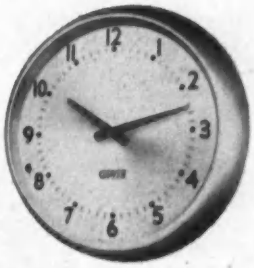
BRS111-C



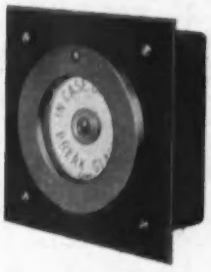
Make a note!

to see GENTS' Electrical Products
at the A.S.E.E. Exhibition, Earls Court, March 15th - 19th





ELECTRIC MASTER CLOCK SYSTEMS · TIME RECORDERS · WATCHMAN'S CLOCKS
SYNCHRONOUS MAINS CLOCKS · PROGRAMME INSTRUMENTS
TOWER CLOCKS · FIRE ALARM SYSTEMS (Manual & Automatic)
STAFF LOCATION SYSTEMS · BELL AND INDICATOR SYSTEMS
LIQUID LEVEL INDICATING RECORDING & CONTROL EQUIPMENT, ETC.



STAND No. 38

GENTS' OF LEICESTER **ELECTRICAL PRODUCTS**

GENT & COMPANY LIMITED · FARADAY WORKS · LEICESTER
London Office & Showrooms: 47, VICTORIA STREET, LONDON S.W.1.
ALSO AT: BELFAST · BIRMINGHAM · BRISTOL · EDINBURGH · GLASGOW · NEWCASTLE

SPECIALISTS FOR OVER 30 YEARS

METER BOARDS
SWITCH BLOCKS
SWITCH BOXES
ELECTRICAL WOODWORK

FIRST CLASS WORK · QUICK DELIVERY · COMPETITIVE PRICES

WOOTTON & CO. LTD

ALMA WORKS, PONDERS END · MIDDLESEX · TELEPHONE: HOWARD 1858

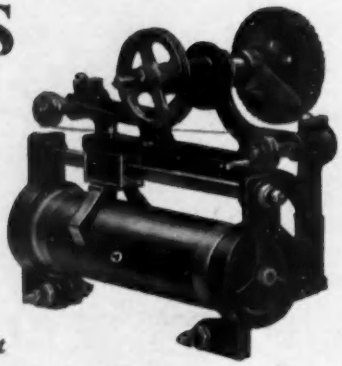
ZENITH
(REGD. TRADE-MARK)

TUBULAR SLIDING RESISTANCES

Back-of-Board Types

As with our Standard Types, these Resistances are made in a great variety of sizes. Likewise, they are extremely durable and robust and incorporate many novel and exclusive features.

Illustrated catalogue of all types free on request



THE ZENITH ELECTRIC COMPANY LTD.

ZENITH WORKS, VILLIERS ROAD, WILLESDEN GREEN, LONDON, N.W.2

Telephone: WILlesden 6581-5 Telegrams: Voltaohm, Norphone, London

MANUFACTURERS OF ELECTRICAL ENGINEERING PRODUCTS INCLUDING RADIO AND TELEVISION COMPONENTS

NOW Creda EV 13

with glass oven door

—this new Creda cooker with the GLASS PANEL in the door

The oven door stays closed—the heat's kept in—yet with the new Creda EV.13 you look in on the cooking!—with no risk of spoiling it: because this Creda has a glass panel with its own door within a door!

What a sensible idea! And remember—it's basically still the same well-loved EV.13 with the same practical features that have made this cooker a best-seller; the same wonderfully even oven heat—and the separately heated drawer, controlled by its own switch, that holds sufficient hot plates for a three-course meal for six people!

Yet this latest Creda cooker costs as little as £35.17.0. And easy payment terms are available in all areas

Order Now and get the full backing of big Advertising Programmes—John Bull—Picture Post Illustrated—Woman—Woman's Weekly

For electric cooking at its wonderful best

***you need a* Creda**

Made by the House of Simplex

Simplex Electric Co Ltd Creda Works Blythe Bridge Staffs and 217/9 Tottenham Court Road London W1

A COMPANY

***you need a* Creda** MADE BY THE HOUSE OF Simplex

Simplex Electric Co. Ltd., Blythe Bridge, Staffs, and 217-9 Tottenham Court Road, London, W.1

1,500 SWITCHINGS PER HOUR

WITH THE B.K.S. D10.60 60 AMP CONTACTOR

Left:
View of Unit

Below:
View of Housing

TECHNICAL FEATURES

Solid Silver Contacts for Extra Long Life · Minimum of Working Parts · Absolute Silence on A.C. · Two Screw Fixing and Easy Wiring · No Maintenance Up to Two Auxiliaries · Neutral Terminal. This B.K.S. Contactor is of compact design and is ideal for reversing duty, lift work, control of industrial processes, and thermal storage systems, etc. It can be supplied for panel mounting, in multi units in steel housings, or as motor starters. It is a precision built unit easily installed, and will give continuous duty, coupled with minimum servicing.

Please send for details to Dept. E.T.

See our Exhibits at the ELECTRICAL ENGINEERS' EXHIBITION, Earls Court, March 15th to 19th . STAND 199.

BRITISH KLOCKNER SWITCHGEAR LTD

Head Office and Works **CHERTSEY SURREY**

Telephone: Chertsey 2067/8 *Telegrams: Switchgear, Chertsey*

MEMBER OF THE DORMAN & SMITH GROUP OF COMPANIES

SALES OFFICES—LONDON: 125, High Holborn, W.C.1. Telephone: Chancery 6431. MANCHESTER: 22, Booth Street. Central 5736. GLASGOW: 249, St. Vincent Street. Central 2479. BELFAST: 11, College Square, North. Belfast 24620. NEWCASTLE: 18, Closefield Grove, Whitley Bay. Whitley Bay 24231. BIRMINGHAM: 74, Buryfield Road, Solihull. Solihull 3926.

*Hot water by electricity?

SADIA

# of course!

The Range of Electric Water Heaters, large and small, to meet every need. Each unit is built to a proud standard of perfection arrived at by more than 30 years of specialisation in electric water heating problems.

Please write for fullest details to :—

AIDAS ELECTRIC LTD., SADIA WORKS, ROWDELL RD., NORTHOLT, GREENFORD, MIDDX.

Phone : **WAXLOW 1607**

Agents for Scotland :— W. Brown & Co. (Engineers) Ltd., 89 Douglas Street, Glasgow, C. 2.

Manufactured in S. Africa by :— Sadia Water Heaters (Pty) Ltd., 3 - 5 Newton Street, Village Main, Johannesburg.

The apparatus shown with the Evershed Recorder here is the Grubb-Parsons S.3 Spectrometer, used for spectroscopic analysis.
(Photo : By courtesy of the Shell Petroleum Co. Ltd.)

EVERSHED RECORDERS AID RESEARCH

at the
Thornton Research Centre of
The Shell Petroleum Co. Ltd.

Infra-red Absorption Spectroscopy is a comparatively recent refinement of analytical chemistry and is used in this instance for the analysis of complex mixtures of petroleum products. It is essential that information obtained be accurately recorded. The sensitivity and responsiveness of Evershed recorders ensure that accurate interpretation is possible from the data given.

FOR FULLER INFORMATION ABOUT EVERSHED RECORDERS WRITE FOR PUBLICATION No. J 222.

EVERSHED **EVERSHED AND VIGNOLES LIMITED**
ACTON LANE WORKS · CHISWICK · LONDON, W.4

Telephone : CHIswick 3670 *Telegrams : Megger, Chisk, London* *Cables : Megger, London*

6/166

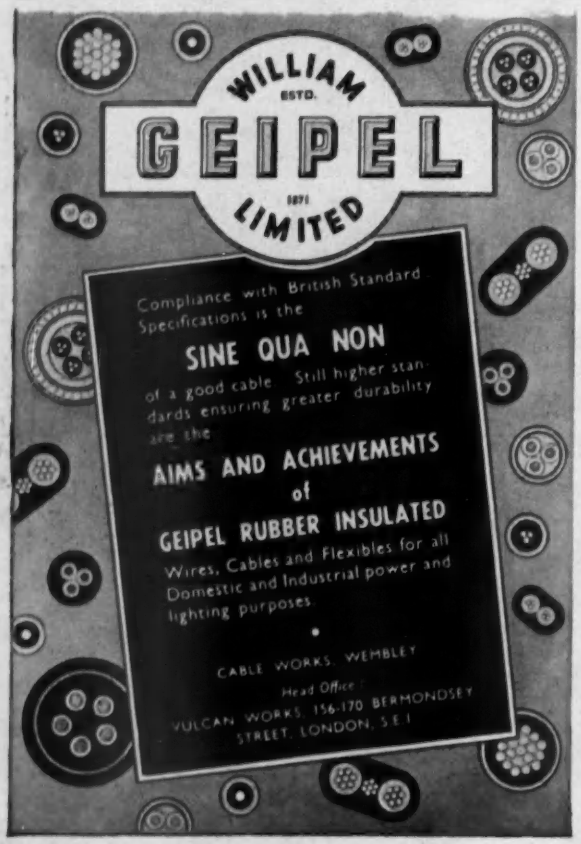
H

COPPER creates confidence

From the planning of a job to its completion there is confidence all the way when copper is used. Those who specify it, those who fabricate it, and those who finally use it in service, all know that copper means a permanent job well done.
For economy and efficiency in the application of copper and its alloys use the advisory service of the C.D.A. This entirely free service exists to help copper to help you.

FIRST ASK THE C.D.A.

COPPER DEVELOPMENT ASSOCIATION · KENDALS HALL · RADLETT · HERTS · RADLETT 5616



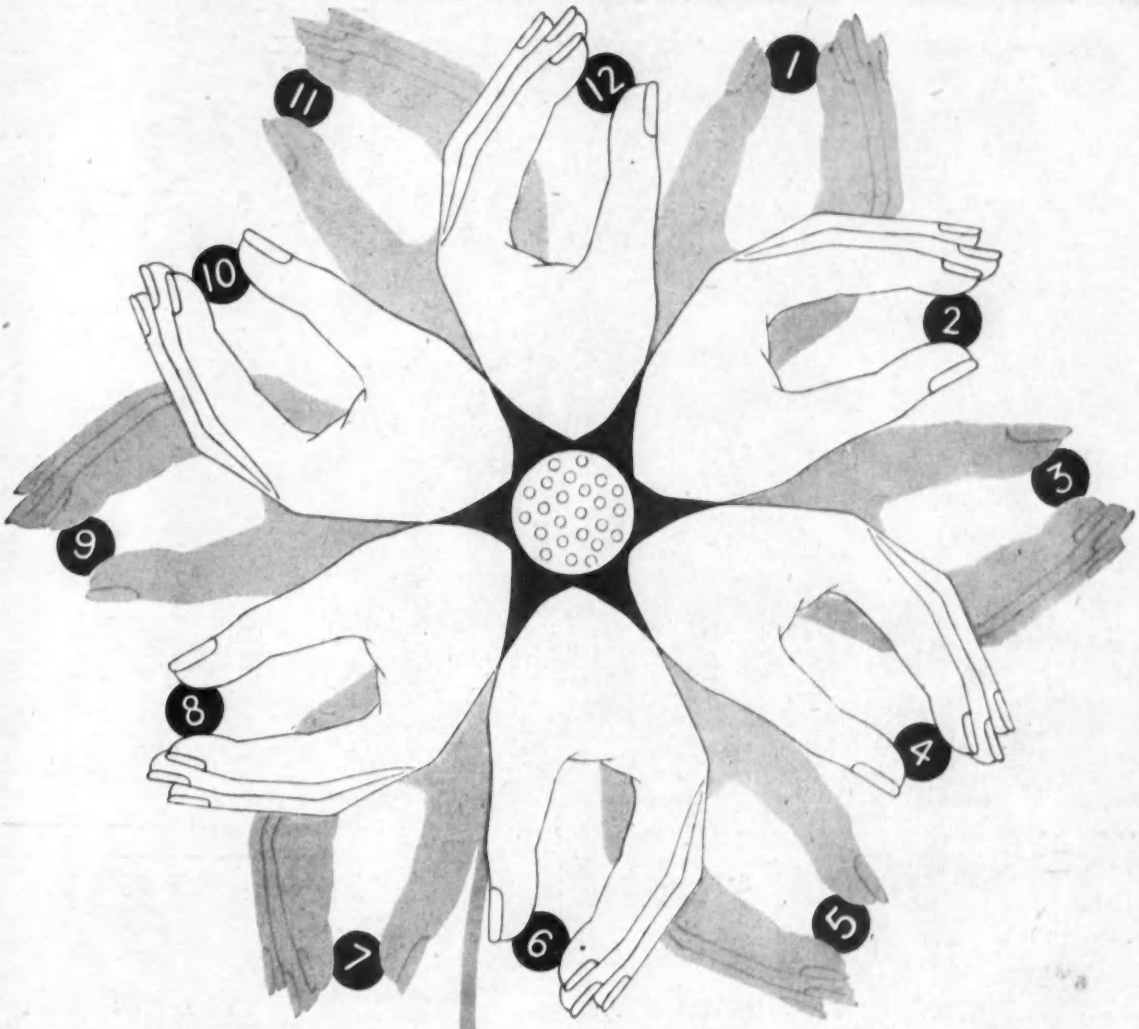
SWITCHGEAR SPECIALISTS

STATTER

J. G. Statter & Co. Ltd., 82 Victoria St. S.W.1

INSTRUMENT WIRES
INSULATING MATERIALS

WEST INSULATING COMPANY LTD.
2 Abbey Orchard Street, Westminster, S.W.1
Telephones: Abbey 2814 & 7352



Resourcefulness in bloom . . .

Originality must always lie in an ability to blossom forth. If you look at the Crompton Parkinson organisation you will find that we have done exactly that thing. From the small bud that was Colonel Crompton's original Company 75 years ago have sprung today twelve outstanding petals—each a department that is representative of the important things in electrical equipment and installation.

Like all blooms, the Crompton bloom will vary in form with the years, but it will continue to win the top prizes in the electricity show. It is an essential part in the world's industrial garden. It is something that should be button-holed whenever you are considering how to use electrical power to its best advantage.

When it comes to electrical equipment . . .

you've got to hand it to Crompton Parkinson LIMITED

CP ELECTRICAL EQUIPMENT

1 ELECTRIC MOTORS OF ALL KINDS. 2 ALTERNATORS. 3 GENERATORS. 4 SWITCHGEAR. 5 B.E.T. TRANSFORMERS. 6 CABLES. 7 INSTRUMENTS. 8 LAMPS. 9 LIGHTING EQUIPMENT. 10 BATTERIES. 11 STUD WELDING EQUIPMENT. 12 TRACTION EQUIPMENT.

CROMPTON PARKINSON LTD., CROMPTON HOUSE, ALDWYCH, LONDON, W.C.2. TEL: CHANCERY 3333

Leakage often affects a whole area

Take no chances-use

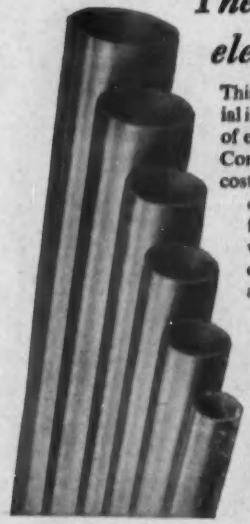
ROTUNDA

INSULATING TAPES

ROTUNDA LIMITED DENTON MANCHESTER

KEY Fibre Conduit

The Key to efficient electrical installations



This non-metallic, pitch-impregnated material is now being widely used for the protection of electrical cables everywhere. Key Fibre Conduit is easy to handle, economical in cost and eliminates any electrolytic action on the cable and is recognised as ideal for the purpose. The material is lightweight in character, and bends present no difficulty. Technical advice and assistance and quotations—on application.

Key Fibre Conduit is now available in two wall thicknesses - one for laying in concrete and the other for laying direct in the ground.

The illustration above shews Key Fibre Conduit laid on a bridge by Westminster Electric Supply Corporation Ltd.—46 years ago.

Export enquiries are invited for bulk supplies against payment in Sterling. New illustrated folder gladly supplied on request together with details of the greatly reduced prices available as a result of home production.

THE KEY ENGINEERING COMPANY LIMITED

4 Newgate Street, London, E.C.1. *Tel:* City 1185-6-7
Telegrams: "Keypoint, Central, London".
Also at: Elevator Road, Trafford Park, Manchester, 17. *Tel:* Trafford Park 1903

Industrial Counting Instruments of Merit

TEC

POWER & DISTRIBUTION TRANSFORMERS

C.S.A. APPROVED

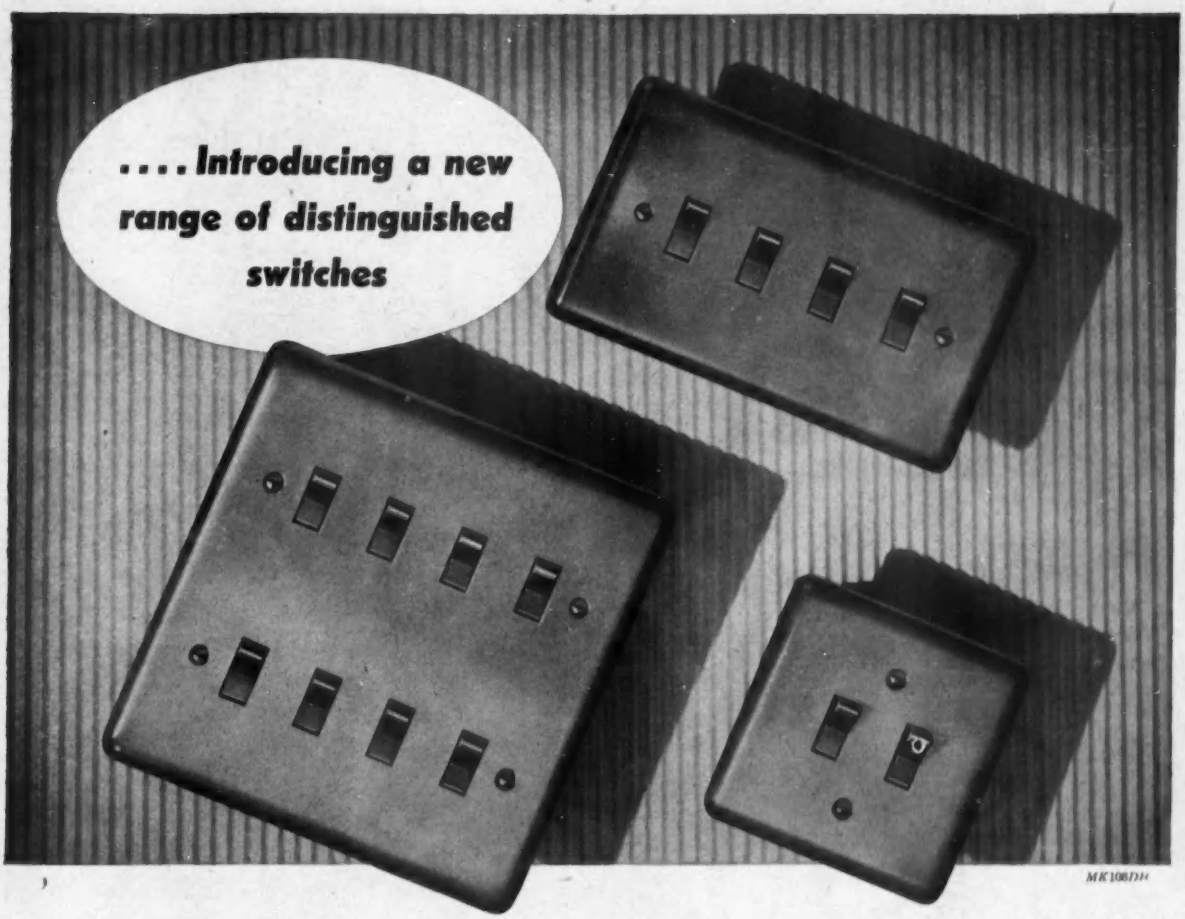
10 VA to 100 KVA Open, Enclosed, Oil Cooled, D.W. and Auto for INDUSTRIAL ENGINEERING, FURNACES, ELECTRONICS, PHASE CONVERSION, ETC.

New Catalogue on Request

THE TRANSFORMER & ELECTRICAL CO. LTD.

Dept. E.T., EASTERN ROAD, WALTHAMSTOW, LONDON, E.17

Phone : KEYstone 5031,2



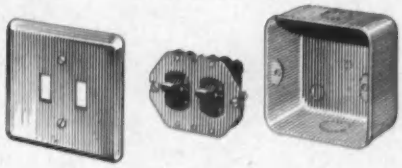
....for the finest installations, where only the best will do.

THE MK FLUSH GRIDSWITCH. An outstanding new range with many attractive features.

- ★ Distinctive modern appearance
- ★ Superb finish in every detail
- ★ Solid brass plates in BMA and matt chrome, or insulated plates in brown and ivory
- ★ Factory-sealed switch units
- ★ Protected or non-protected dollies
- ★ Ultra-compact 1 to 8 gang units

....see them on Stand 56 at the Electrical Engineers Exhibition

MK ...the mark of leadership



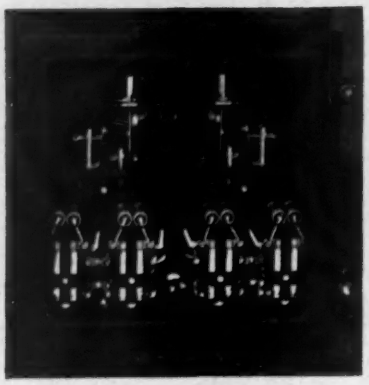
The switches are mounted on removable grids for easier wiring. The flush boxes are seamless and deep-drawn, allowing ample cable space. Bonderising gives extra rust protection, and multiple knockouts provide a good choice of entries.

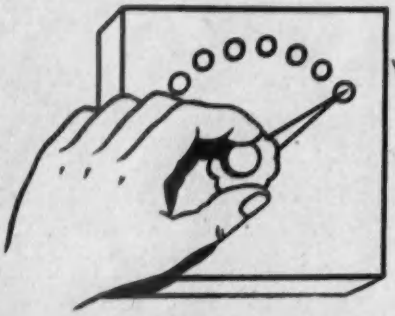
The Gridswitch is in every respect a design worthy of the finest work. *Ask for leaflet 232 which illustrates the whole range.*

M. K. Electric Limited, Wakefield Street, London, N. 18 *Edmonton 5151*

COXOHM AUTOMATIC VOLTAGE REGULATOR

- Suitable for large A.C. or D.C. machines.
- Possesses extreme sensitivity.
- Accurate to within ± 1%.
- Full balancing gives stability under mobile conditions.
- Simple to install and to put into operation.
- Maintenance negligible.





As specialists in the field we shall be pleased to advise on the question of automatic voltage regulation if we may receive particulars of your specific requirements for any loading.

COX WALKERS LTD.

NORTH EASTERN ELECTRIC WORKS

Established 1880 **DARLINGTON** *Phone 2387*

SMALL

PRECISION MOTORS

FOR SPECIALISED APPLICATIONS

S. G. Brown Ltd

OFFER A RANGE OF 10 SMALL MOTORS OPERATING AT VARIOUS VOLTAGES

UNIQUE DESIGN
EXCEPTIONAL PERFORMANCE
HIGH GRADE FINISH

AS SUPPLIED TO THE BRITISH ADMIRALTY AND OTHER GOVERNMENT DEPARTMENTS

For full Details and Technical Specifications write

S. G. BROWN LTD.

SHAKESPEARE STREET, WATFORD, HERTS

TEL.: WATFORD 7741

Service &

ENTerprise 6222

AUCHTERLONIE

BALL BEARINGS
ROLLER BEARINGS
PLUMMER BLOCKS, etc.

Immediate Delivery Keen Prices. Write for monthly stock list A.1

CHAS AUCHTERLONIE & CO., LTD.

32 STATION RD., NEW SOUTHGATE, LONDON, N.11

MERITUS

INDUSTRIAL LIGHTING BRACKETS

Robust Construction both Electrically and Mechanically for

WORK BENCHES, LABORATORIES MACHINE LIGHTS, GARAGES, ETC.

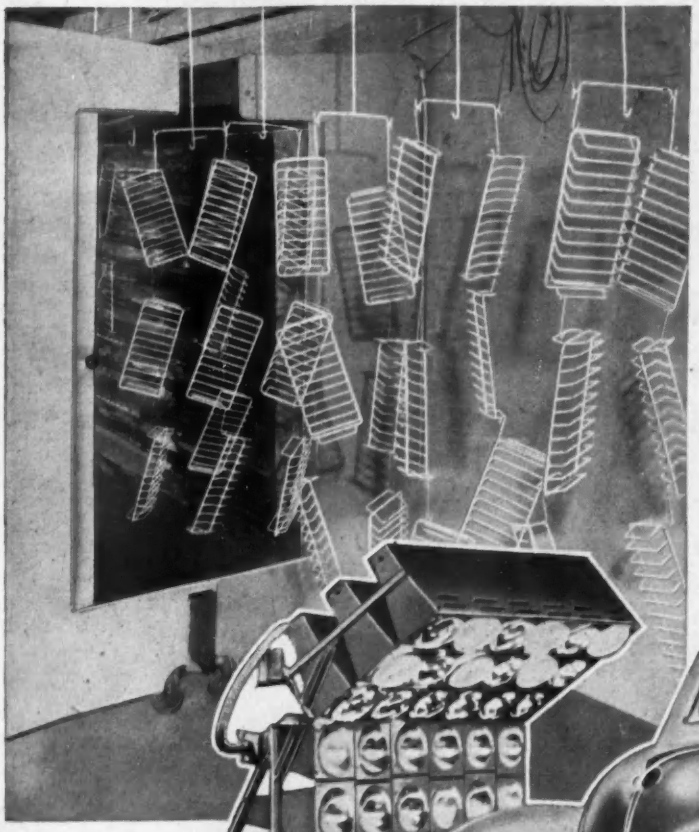
Use in conjunction with Meritus Low Voltage Transformers

MERITUS (BARNET) LTD. BARNET, HERTS Tel.: Barnet 2291/2

but not for long

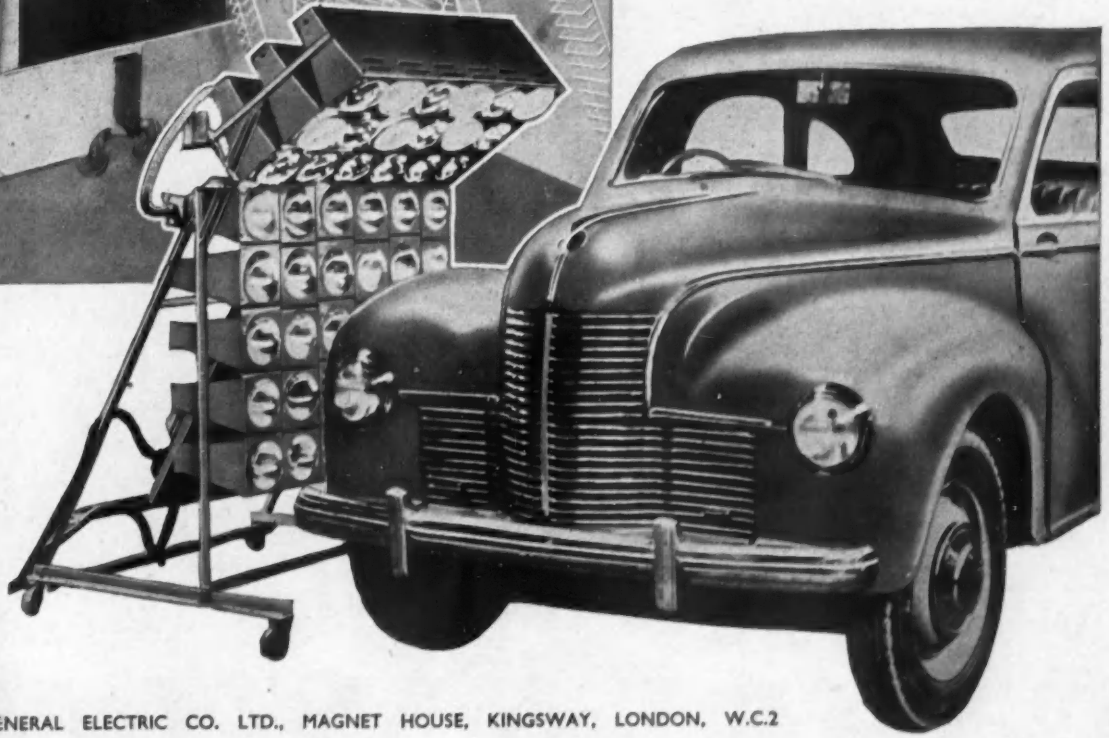
with G.E.C.

RADIANT HEATING



Stoves paint speedily– perfectly– lastingly!

Plate racks and car chassis — just two of a wide variety of products on which paint is stoved in a few minutes with G.E.C. Radiant Heating.



THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

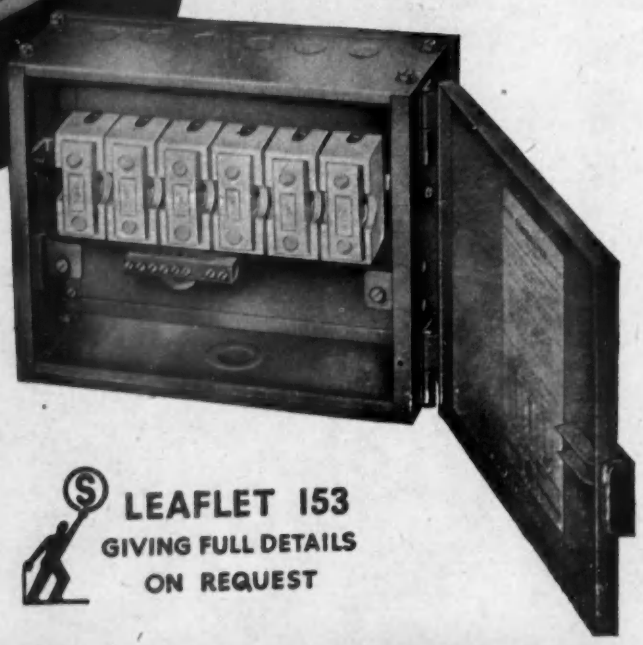
EARLS COURT ELECTRICAL ENGINEERS EXHIBITION LIMITED MARCH 15th TO 19th 1955

NOW

"SANDALITA"

250 VOLT SP & N FUSEBOARDS

. . . very inexpensively incorporating one of our long established and well tried fuses in a modern, light, sheet steel case.



A further item in the development programme of

SANDERS
WEDNESBURY

LEAFLET 153
GIVING FULL DETAILS ON REQUEST

WM. SANDERS & CO. (WEDNESBURY) LTD., WEDNESBURY, STAFFS.

Printed in England by Staples Printers Limited at their Great Titchfield Street, London, establishment, for the Proprietors, The Electrical Times Ltd., and published at Sardinia House, Sardinia Street, London, W.C.2.

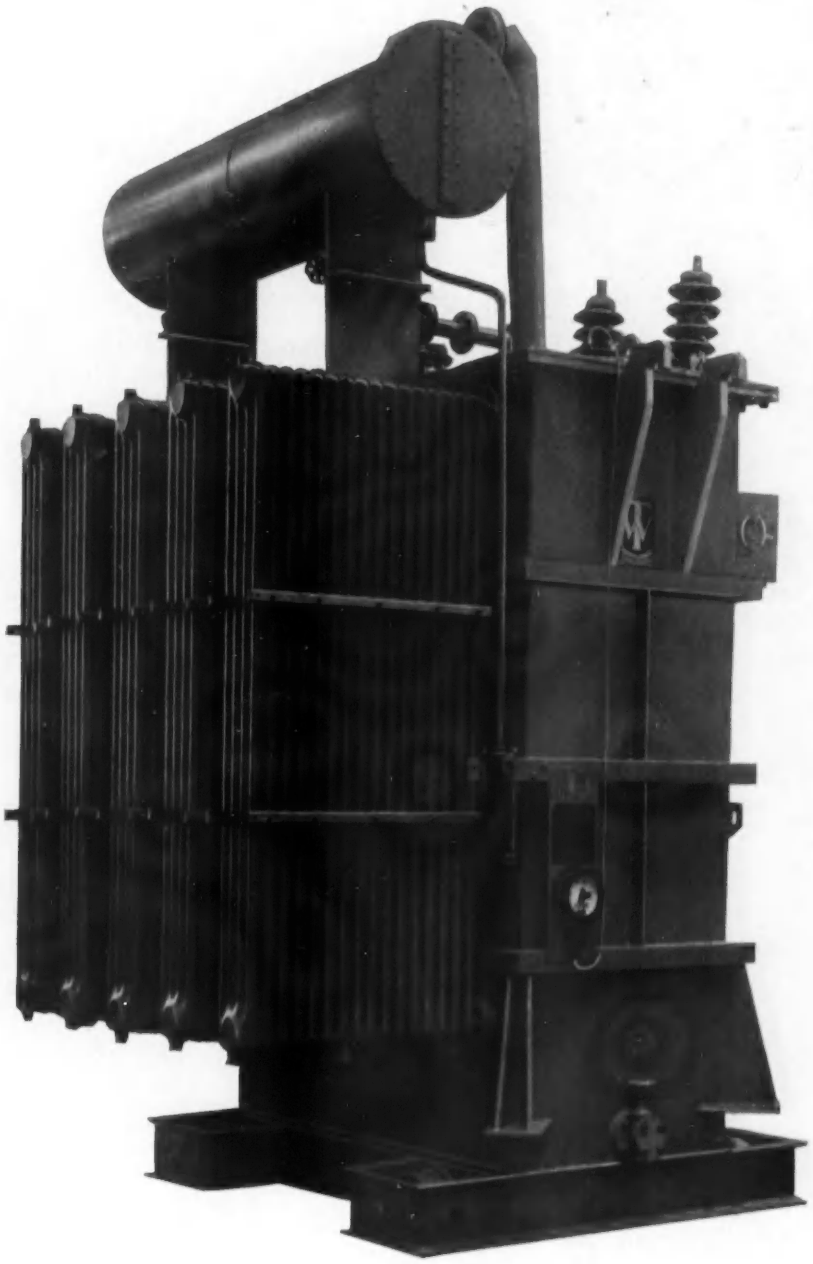
TRANSFORMERS

FOR
RELIABILITY

SOUND
DESIGN

GOOD
CRAFTSMANSHIP

IN
ALL TYPES
OF
TRANSFORMERS
UP TO
35,000 kVA



SPECIFY

TRANSFORMERS (WATFORD) LIMITED

SANDOWN ROAD - WATFORD - HERTFORDSHIRE

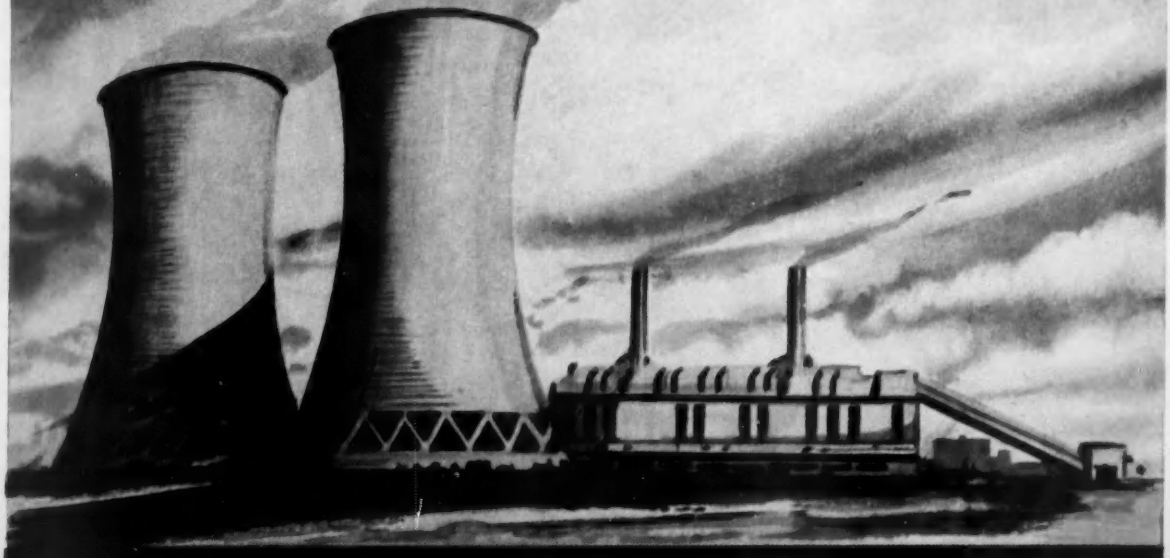
TW/1/54

CONDENSING PLANT
AND AUXILIARIES

FEED HEATERS · ATORS · EVAPORATORS · SELF CLEANING WATER STRAINERS

FOR

POWER STATIONS



HICK HARGREAVES
AND COMPANY LIMITED · BOLTON